

The Iron Age

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Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXXVII: No. 3.

New York, Thursday, January 21, 1886.

\$4.50 a Year, Including Postage.
Single Copies, Ten Cents.

Engines of the British Steamship Enfield.

We reproduce from a recent issue of *Engineering* the annexed cut of the triple-expansion engines of the steamship *Enfield*. They are the first set of triple-expansion engines built by the Central Marine Engineering Co., of West Hartlepool, from the designs of Mr. Thos. Mudd, and possess many features of special interest. The cylinders are 21 inches, 35 inches and 57 inches in diameter, respectively, and 39-inch stroke. They are supplied with steam from two single-ended boilers at a pressure of 160 pounds per square inch above the atmosphere. The crank-shaft has only four main bearings, instead of the usual five or six, and these bearings are of enormous length compared with ordinary practice. The crank-shaft is designed to suit the valve gear, which is of the dynamic order, the one eccentric that is necessary for each engine being forged solid with the after crank-throw of each crank. The forward cheek of each crank is recessed to receive the flange of the adjoining piece of the shaft, and by this means both eccentrics and couplings (which are the constant impediments to a sufficiency of main bearing in the ordinary design of marine engines) are satisfactorily removed from the body part of the crank-shaft, which is then simply carried, throughout its whole length, in the four bearings. Of these bearings the two inner ones, which each extend from crank-throw to crank-throw, are each nearly two and a half diameters in length; the two outer ones are made about one and three-quarters the diameter in length. All the main bearings run on white bronze over their whole bearing surface, the bronze being run into very stout and rigid cast-iron blocks, which can be removed for refitting or examination at any time without the removal of the crank-shaft.

The distance from the center of the high-pressure engine to that of the mean-pressure engine is the same as from the latter to the low-pressure engine, so that the crank-shaft of any engine will fit any other, and only one-third part of the shaft need be carried as spare gear. Each of these parts is built up of separate pieces shrunk together, the pins being forged from hollow ingots of steel of the finest quality. These pins have a length of bearing more than one and a quarter times the diameter of the shaft. Like the main bearings they run on white bronze, which is put in a similar manner into large cast-iron blocks carried by the ends of the connecting-rods. The bottom of the sole-plate is flat, and the main bearings are supported upon the ship's engine seating right through from front to back of engine, instead of being bridged over from a front stool to a back stool, as is too commonly done. This plan, besides being considered by the builders to be the best, admirably accommodates itself to a new system of erecting engines in the shop which the Central Marine Engineering Co. have inaugurated.

In large engines like those of the *Enfield* it is, of course, necessary to make the main framework castings in more than one piece, and the designer has struck a new line in this matter by cutting the condenser horizontally in the middle, instead of vertically between the back columns, as is usual. This may appear an exceedingly insignificant change, but it is certainly most fruitful of good results both to the engine and to the constructor. It gives the engine the advantage of having the whole of its base in one strong casting, far stronger than can be got by the plan of making a separate bed-plate alone, with the whole condenser set above it as a separate casting; and it has the merit over the plan of cutting the condenser vertically that the whole of the vacuum joint is above the starting platform, where it is both easily examined and not likely to go wrong. The engine has yet another advantage from it in that there is no vertical joint anywhere, it being a common practice to have vertical joints either just in front of or just behind the main bearings. These joints are never safe without keys, and are certainly better avoided altogether.

It will be seen that special attention has been given in the design of these engines to secure rigidity of general structure. The two box-section forked columns are admirably adapted for giving both fore and aft and thwartship stiffness, and by making the inner lines of these columns quite vertical the strains are conveyed in a most direct manner to the bed-plate without giving the slightest chance of any alteration of form. These columns are used as oil tanks, and hold 300 gallons of oil. A glance at the engines will show how thoroughly accessible all the cranks and working parts are, despite the adoption of rigid cast-iron front columns, which are often accused of having the fault of rendering the working parts of an engine

inaccessible. The connecting-rods are 18 inches more than four cranks in length, and are adjustable for length as well as for wear. The main guides are carried by the back columns—which we have already mentioned as being cast in one with the upper part of the condenser—and consist of separate guide-plates bolted to the flanges on the columns, the guides having wrought-iron pipe water-courses cast in them for the circulation of cold water, provision being made for the clearing of each pipe in case of its getting stopped. Between the guide-plate

cylinders are cast separately and joined together by faced joints the full length of the cylinders. These joints are not steam joints, but mere bracket attachments. All the valves are piston-valves, arranged in a uniform manner at the back of the cylinders and in one straight line, the valves being thus easily overhauled by placing a separate lifting beam and tackle in the engine skylight immediately over them. A line drawn through the centers of the valve cylinders is not parallel to the center line of the engines, but oblique to it, the valves being each

an independent steam-supply pipe, so that any jacket can be used or disused at pleasure; or the several jackets may if desired be supplied with steam at different pressures. The pressure being as great as 160 pounds per square inch, it was thought advisable to make the hand throttle-valve and the starting-valve of the piston type, the throttle-valve being fitted with spring rings, so as to insure absolute steam-tightness.

The valve gear possesses perhaps the fewest working joints of any reversible valve gear applicable to large en-

lined with phosphor-bronze liners, and made adjustable in two directions. The angle of the dynamic slides is alterable by means of a hand-wheel on each engine while the engine is running; the hand-wheel on the high-pressure gear controls the total power to be taken out of the engine by regulating the cut off in the first cylinder, and the other two control the distribution of that total power among the three engines.

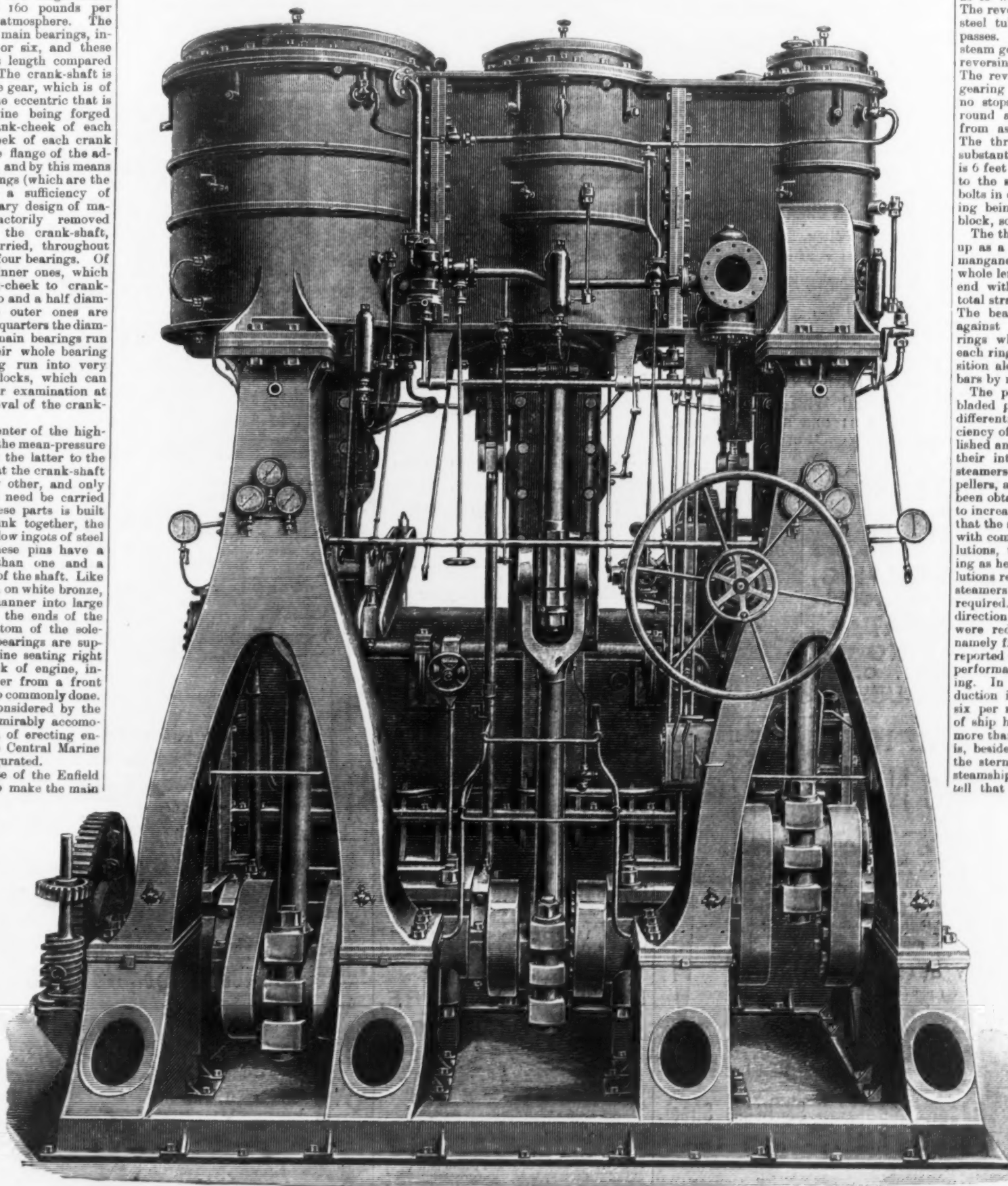
The steam reversing gear consists of a very snug two-cylinder oscillating engine placed upon the condenser in such a position as to work direct on to the reversing shaft. The reversing shaft in the *Enfield* is a hollow steel tube, through which the hand-shaft passes. The small hand-wheel controls the steam gear, and the large hand-wheel is for reversing by hand when occasion requires. The reversing shaft has on it a steel worm gearing into a steel worm-wheel, which has no stops whatever, but may be revolved round and round, reversing the engines from astern to ahead at each revolution. The thrust-block is of a most massive and substantial character. The base of the block is 6 feet 6 inches in length, and it is secured to the ship's thrust-seating by 12 1½-inch bolts in drilled holes, the holes in the seating being drilled through the holes in the block, so as to insure firmness.

The thrust both ahead and astern is taken up as a tensile strain by two large bars of manganese bronze, screwed throughout their whole length. These bars are fitted at each end with large steel nuts for taking the total strain against large bosses on the block. The bearing surfaces of the shaft bear against large horseshoe-shaped cast-iron rings which are faced with white bronze, each ring being adjusted and secured in position along the screwed manganese bronze bars by means of steel nuts and check nuts.

The propeller is a solid cast-iron four-bladed propeller on Mr. Mudd's improved differential-pitch principle, the high efficiency of which is now becoming well established and recognized in the North. Since their introduction 18 months ago over 20 steamers have been fitted with these propellers, and the most flattering results have been obtained. The aim of the designer was to increase the efficiency of the propeller, so that the speed of the ship might be kept up with comparatively a small number of revolutions, thus saving steam and fuel, believing as he does that a high number of revolutions results in a preventable loss in cargo steamers where high speeds of ship are not required. So far has he succeeded in this direction that in one steamer the revolutions were reduced as many as 10 per minute—namely from 61 to 51—and the speed of ship reported as good as the ship's best previous performances, a large saving of coal resulting. In several other cases where the reduction in revolutions varies from three to six per minute a marked increase in speed of ship has resulted, in some cases even to more than a knot per hour. This propeller is, besides, stated to cause no vibration at the stern of the ship. In the case of the steamship *Enfield* it was scarcely possible to tell that the propeller was working when standing beside the after steering gear. The *Enfield* is 275 feet long, 37.2 feet broad and 20.6 feet mean draft.

The *Sveat* is the name of a steamer constructed for the Russian Steam Navigation and Trading Co., which has just arrived at Odessa, and is intended for carrying kerosene, and if necessary petroleum itself, or even petroleum naphtha; but there will probably be some hesitation in shipping such cargoes. The vessel is 286 feet long, 36½ feet wide, and draws 18 feet of water when fully loaded. The engines indicate 1100 horsepower, and the mean speed is 11½ knots. The middle part of the body of the vessel is taken up with 16 cisterns or tanks to hold kerosene, arranged in two rows of eight cisterns in a row. Each cistern will contain about 530,000 gallons. Outside each row of cisterns is a passage or corridor, and between the

under part of the lower range of cisterns and the bottom of the steamer is a vacant space to admit the possibility of at all times examining the state of the cisterns from underneath them. All the cisterns of both rows have a pipe leading to a cistern on the upper deck. At the lower part of the steamer, outside the cisterns, is a pipe 12 inches in diameter, connecting, in conjunction with other pipes, the pumping machinery with the whole of the cisterns. In order to prevent the accumulation of gases in the corridors running alongside the cisterns, 16 large-sized ventilating tubes are provided. Eight of these introduce air from without, and eight withdraw the gas from the corridors. The *Sveat* is intended to carry petroleum from Baku to Odessa, the oil being conveyed to Baku from Baku by the pipe line.



TRIPLE EXPANSION ENGINES OF THE BRITISH STEAMSHIP ENFIELD.

and the column an air passage is also provided for the circulation of air. The go-astern guides are bolted at the sides in the usual manner. The crossheads are fitted with cast-iron adjustable slide shoes, which are fitted upon a taper in such a manner as to give the crossheads a thoroughly tight hold of the shoes both when going up and coming down. For want of such a provision crossheads that are fitted with shoes that have only a flange at the top have been known to leave their shoes when the guide has become hot, the almost inevitable consequence being a serious breakdown.

The piston-rod glands are all fitted with a gun-metal worm and worm-wheel arrangement, by means of which all the four gland nuts are tightened up together by a hand-wheel. The engineer can, with this attachment, tighten the glands with the greatest ease when the engines are running full speed without the slightest danger to himself. The

snugly placed by the side of the cylinder to which it belongs, so as to reduce the clearance spaces as much as possible. Thus the clearances (average of top and bottom) are as follows: High-pressure cylinder, 8.6 per cent.; mean-pressure cylinder, 7.7 per cent.; and low-pressure cylinder, 8.1 per cent. of the respective cylinder capacities. The covers of the valve chambers are of uniform design with those of the cylinders, and flush with the latter, giving a very neat appearance to the top of the cylinders. All the cylinders and all the valve chambers are lined with hard cast-iron liners fitted steam-tight. The liners of the cylinders form steam-jackets completely round the cylinders. Both covers and cylinder bottoms are jacketed where possible, and the larger covers are all fitted with separate cover-plates with a padding of silicate cotton beneath. The cylinders themselves are well covered with non-conducting materials. Each steam-jacket is fitted with

gines. It is of a form that permits of great strength being given to the parts, and easy disconnection for examination. All the pieces are adjustable for length as well as for wear, and marks are provided by which the engineer can at any time line up every part to its original condition, so that the position of the motion of the valves need never vary. The gear is placed at the back of the engines, and is always fully in view and perfectly accessible from the starting platform. In the high-pressure and mean-pressure engines the valve connecting-rod goes direct from the eccentric strap to the valve spindle end, the valves being so placed as to permit of this direct lead. In the low-pressure case the large diameter of the valve necessitates the introduction of a lever. The spindles, valve-rods and reversing-rods, are all of forged steel, and all the valve-gear brasses are of phosphor-bronze. The eccentric straps are 4½ inches wide,

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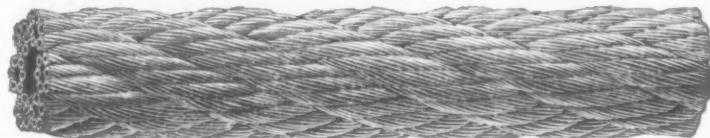
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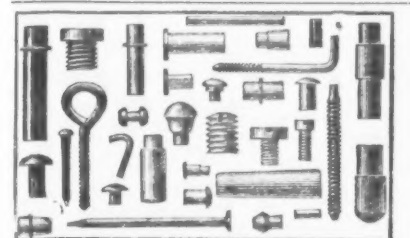
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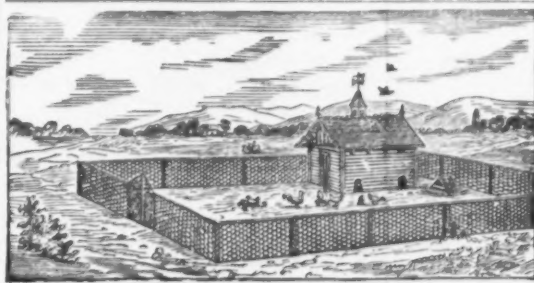
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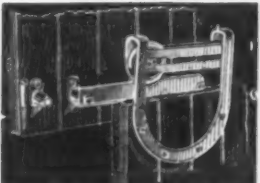
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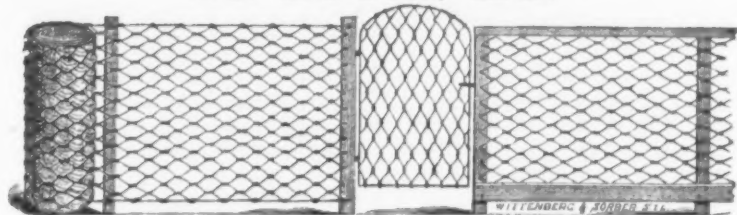
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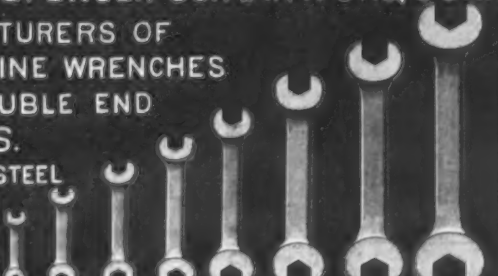
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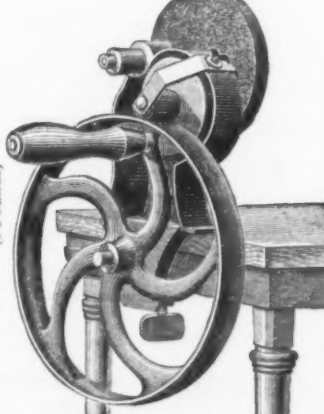
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Special Wheels for Furnace and Mine Cars.

Drawing Wire without Pickling
Acids.

The following paper was read at the
winter meeting of the German Iron Trade
Association, held at Disseldorf on Decem-
ber 13, by Dr. Wedding, Privy Councillor of
Berlin, on the "Drawing of Wire without
Pickling with Acids."

In the course of the present gener-
ation the wire industry has made im-
mense strides in Germany. At present
the quantity of wire produced in the
Zollverein is 40 times as large as it was
in 1850. This industry also occupies a position
of special importance in the Father-
land, because, more than any other branch
of the iron trade, it lays itself out for
exporting its products. The official statistics
for 1883 go to show that the wire-
makers export fully 63 per cent. of their
aggregate output. This fact in itself
proves that the straits which this industry
has to contend against are such as cannot be
remedied by any import duties, let them be
ever so prohibitive, seeing that its market
is not the inland alone, but the world at
large. The great point for the wire-
drawers is not protection, but reduction of
the cost of production. The question arises,
How can the expenditure be lessened?
The first head of this expenditure is the
power required to reduce the iron from one
section to another. This power must re-
main as it stands. Next in order come the
auxiliary and subsidiary operations. Among
these the annealing and pickling processes
play the most important part. There is
some special interest attaching to the pick-
ling operation, for the pickling waters,
when once exhausted, become utterly use-
less and must be let out into rivers. Con-
siderable injury is done by this to the lands
which are situated below the works. The
owners of such property complain
and demand damages, and the conse-
quences involved by the contamination of the
rivers are unsatisfactory to both parties
alike. Hitherto it has been found impos-
sible to afford the neighbors any kind of pro-
tection against the deleterious nature of those
waters; and yet the acids diluted in
them are so very weak that, were any
attempt made to turn them to useful account,
it would soon be found that the ex-
penses connected with such process are
very much greater than the proceeds to
be derived therefrom. The very cogent
question arises, Could not wire be drawn
without acids being used for the purpose?
As far back as two years since the Berlin
Association for the Promotion of Industry, at
Doctor Wedding's instigation, offered a large
reward to whoever would propose a practical
solution of the problem. As yet, no
such solution has been furnished; and, in
consequence of this, the association has ex-
tended the time allowed by one year. Under
these circumstances Dr. Wedding considers
it his duty to give an account of his own ex-
periments, so as to benefit those who may
feel inclined to give their attention to the
solution of this important question.

Prior to giving a statement of the experi-
ments made by him in his laboratory, the
lecturer reviewed all the more modern ma-
chines which have for their object to sup-
plant the use of acids by mechanical opera-
tions, such as shaking, knocking, grinding,
&c., for the purpose of getting rid of the
scale. Unfortunately the result of this re-
view is purely negative, for it would appear
that none of the mechanical arrangements
devised have produced the desired effect.
The latest report of the Dortmund Trade
Corporation shows that of 92 works, con-
taining 450 benches, only 12, containing 80
benches, have as yet introduced such me-
chanical arrangements, the managers of all
the others declaring that they cannot per-
form the work without the use of acids.
The negative character of these results, and
the failure of his own experiments, have led
the lecturer to consider whether it would not
be possible so to anneal the wire as to avoid
scales altogether—that is to say, to anneal it
in molten baths. His first cars were always
to work under conditions exactly identical,
so as not to be led to draw inferences from
heterogeneous premises. Some valuable ma-
terials taken from practice were supplied
to him for the purpose by Herr Dräcker,
Kreuzthal. First of all he sent him a
rough-drawn wire of uniform thickness of
2 mm., which, prior to being drawn out any
further, would in practice have had to be
subjected to an annealing and pickling
process. Then he supplied him with a draw-
plate of the kind used for practical purposes,
thereby enabling Dr. Wedding to draw out
that wire to a thickness of at least 1 mm.
The lecturer then procured from Aschaff-
enburg a small micrometer with which to
measure thicknesses down to 1/16 mm. The
wire was 2.5 mm thick, and was, in the
first place, to have been drawn out to 1.55
mm., the result being 1.83 mm. The next
question was to find out the power required
for drawing this wire. First, its resistance
was ascertained to be as follows: Tensile
strength, 79 kg.; limit of elasticity, 63.2
kg. As regards the speed at which the
work could be done, the experiments
went to show that a speed of as much
as 4 m. was admissible, being very much
less than the rate at which the work is done
in practice. This makes it likewise clear
that, in following the ordinary method, the
same wire could not have been drawn.

The lecturer next began to work at the
rate of 2 m. per minute, and at this rate he
actually succeeded in drawing the wire
without having previously annealed it. The
thickness of the scales of wire never exceeds
1/16 mm. He now took a wire with scale
upon it; he found that there is good reason
for removing the scale entirely, as is gen-
erally done in practice. For, in the first
place, the power that had to be used ranged
from 110 to 220 kg., and, secondly, the op-
eration took place by fits and starts, because
the scale in coming off constantly caused
shocks. But the greatest objection was that as
soon as 3 m. of wire had been drawn through
the hole would become wider—so much so
that drawing wire with scale on it was
practically out of the question. The great
point now was to ascertain the power re-
quired to draw the wire without annealing.
It was found that with a force of 105 kg. a
wire of 2.5 mm. was thinned down to 1.53
mm. in passing through the following hole

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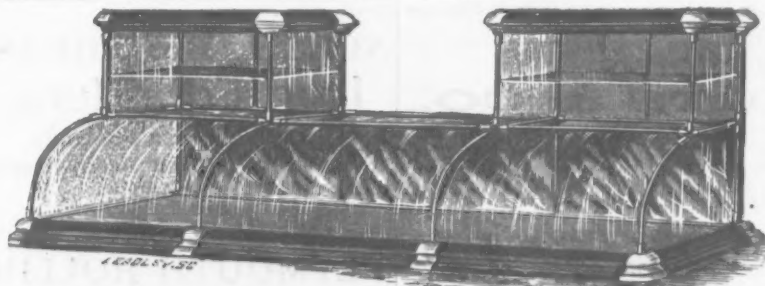
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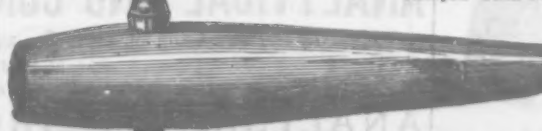
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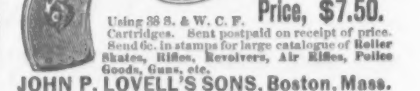
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It then became necessary to see what effect would be produced by annealing and pickling. The result was that the wire could be drawn with a force of 64 kg. True, a part of the wire had been absorbed by the annealing process. It may therefore be assumed that for the purpose of drawing out the wire down to 1 mm. the necessary power must be double, treble or even five times as great.

The lecturer now placed the wire in a concentrated solution of common salt, because he understood from a statement he had received from America that chloride of sodium produced a favorable effect as a lubricant. The result, however, was purely negative, and remained so even after a whole series of other salts, sulphate of magnesia, &c., had subsequently been used. After this it was proposed to him to furnish the wire with a thin metal coating. Having drawn it through a lye of copper, he found that it certainly could be more easily drawn, but was in no way improved in other respects. At last he fell back on caustic soda. Herr Honigsmann, the inventor of the fireless locomotive, in which caustic soda is used, asserts that iron is not affected by this last-named chemical. The lecturer did not find this statement borne out by his own experience; on the contrary, he found that the soda always penetrates into iron, and that it does so continuously. The experiment with caustic soda in liquid condition did not yield any more favorable result. The power required in drawing descended down to 90. On passing through the drawing-hole a second time the wire broke, which proves clearly that caustic soda is not the thing required to be able to do without annealing and pickling. The next question that arose was, What temperature was required to anneal the wire? It was thought that possibly the annealing temperature used in practice was much too high. The lecturer applied a heat ranging from 150° to 800° C. Having procured some paraffine, and heated it up to the boiling point, he then drew the wire through it, leaving it therein a sufficient length of time. In drawing the wire hot from the bath through the drawing hole, a power required in drawing was 80, and, in allowing it to cool down first, the power was found to be exactly the same. Dr. Wedding then heated paraffine up to the point of ignition—that is to say, 225° C. The power required now descended to 60, both in hot and cold drawing, and there seems to be good reason for hoping that paraffine would be found an excellent medium for drawing wire. Unfortunately, this hope has not been borne out by the event.

In the sequel zinc was tried and heated up to melting point—that is to say, 235° C. The power required for drawing now descended to 52 when the wire was hot, and to 80 when it was cold. The highest melting point that could be reached was that of common kitchen salt, viz., 776° C. The power for drawing was now 70 kg. when hot and 90 kg. when cold. Of all possible methods the one that had to be discarded from the first was galvanizing the iron. The explanation of this is not far to seek. Zinc forms with iron on its surface a hard alloy, and the zinc enters into the very structure of the iron when the wire has reached the melting point of zinc. The separation of the coating from the wire took place by fits and starts, and this accounts for the high figures which became a bar to all further experiments. The trials having been carried thus far the lecturer proceeded to test the wires he had subjected to all these different treatments. They all broke, save only one that had been drawn hot through paraffine. The power required for drawing was 20 kg. at the second and 50 kg. at the third heat. Beyond that it was found impossible to go. As a last chance lead was resorted to, and in this case the result proved more favorable. The figures he found in succession were 35, 37, 30 and 25 kg. The wire was perfectly flexible and sound. The inference drawn from the result achieved by the use of the lead bath is that the temperature of molten lead—that is to say, 324° C.—is sufficient to neutralize the tension within the wire. The whole of the heats were gone through in the same way, and the wire having once passed through the lead, it became an easy thing to draw it out twice.

Dr. Wedding now produced specimens of wires that had gone through a lead bath, and invited attention to the thin coatings that had adhered to the wires, and which protected them from oxidation. Inasmuch as lead is oxidized more readily, it seems natural enough that it should protect iron from further oxidation. The lecturer is of opinion that it would be well worth while to make further trials on a larger scale, so as to ascertain whether the annealing in lead baths would not form a fitting substitute for ordinary annealing and pickling. The new method would require the use of an apparatus embodying all modern improvements, and admitting of the wire being drawn through all the holes. The wire would have to be drawn from the drum through the drawing-hole, and from the hole transferred to the lead bath, in which it would have to stop until it has been heated up to the required degree. This last process could take place without interrupting the drawing operation; a considerable saving of time and expense might possibly be achieved by this. Lead is no doubt a very expensive material, but it must be borne in mind that the same body of lead may be used again and again. There is one drawback which consists in the fact of wire treated in the manner alluded to taking a coating of litharge, the evaporation of which must be very injurious to health. But there is nothing easier than doing away with this inconvenience. The wire need only be coated with charcoal, by means of which the oxidation may be impeded for a length of time. It is obvious that the results of experiments made in the laboratory must be judged *cum grano salis*, so long as it has not been shown that those obtained in practice will agree with them.

The manganese mines of the Charapau district, 26 miles from the nearest railroad station, at Kvirila, Southern Russia, are growing in importance. In 1884 the output was 12,050 tons, and it is expected that during the current year it will increase to

27,550 tons, of which 16,400 tons will be shipped from Batoum, and 11,150 tons from Poti. The bulk of the ore goes to England.

The Heavy Stocks of Pig Iron in Great Britain.

The *Ironmonger* calls attention to a matter which the American iron trade should carefully consider. We quote the following from a recent editorial:

The trade brought forward into the new year one of the largest, if not the absolute largest, stocks of pig iron that has ever existed. In Scotland alone there are 1,050,000 tons on hand, in the Cleveland district about 500,000 tons, on the West Coast 368,500 tons, and in the other smelting districts probably about 550,000 tons, so that the reserve stocks may be taken to amount to about 2,468,000 tons, as against the 1,668,729 tons estimated on June 30, 1885. On December 31, 1884, the stocks were 1,809,467 tons; at the end of 1883, 1,698,976 tons, and at the close of 1882, 1,658,120 tons. If this estimate be correct—and it is so far founded on ascertained facts as to be very near the mark—it is apparent that we begin 1886 with something like 658,000 tons more pig iron on hand than at the commencement of 1885. This is a fact which does not seem to give promise of an early and considerable revival in prices, seeing that, supposing every blast furnace in the country were to stop, we have on hand sufficient for four months' consumption of pig iron. They will not stop, however, but will go on producing at the rate of 600,000 to 650,000 tons per month, or rather more than is needed for the consumption, supposing it to be maintained at the present rate. Apart from the reserve stocks, therefore, we are fully able to supply our requirements even from the comparatively limited number of furnaces now in blast, and there is no likelihood of the stocks being lessened, unless in the event of a greatly and suddenly augmented demand or a large and fixed limitation of the production.

In discussing the problem at issue, therefore, one of these two alternatives must come into play to balance the production with the consumption. Whether either of them will do so is quite doubtful; consequently, the probabilities seem to rule in favor of prices not widely different from those now in force. The only direction in which the demand could be greatly increased is the United States. Already about 100,000 tons of hematite pigs have been ordered here for delivery in that country in 1886, besides which some parcels of Scotch pig and spiegel are also to be shipped. Should the American orders assume really important proportions this market would undoubtedly respond, but it would appear that it is only from the States that we can possibly get relief. Failing that, the other resource is an organized and strictly-observed limitation of production. Were heroic remedies in favor the smelters might stop for three months; but as matters now stand that is quite impracticable, and the utmost that can be looked for in the way of restriction is the suspension of a percentage of the furnaces over a longer period than that just named. Reasonable stocks are probably very useful, inasmuch as they operate as a sort of fly wheel and prevent unduly violent fluctuations; but when they reach the proportions they have now attained they are a heavy burden for the trade to carry, and in at least one case would seem to call for some inquiry into their exact composition.

Coiling Copper Tubes.

Referring to the coiled copper tubes made by the Muntz Metal Co., of Smethwick, England, and shown at one of the recent exhibitions, *Engineering* says:

The ordinary method of bending copper pipes to helical or spiral form is to fill the straight length with rosin, lead or sand to prevent it from becoming flattened under treatment, and then to coil it upon a drum of the appropriate shape. After the pipe has received the required figure the core is melted or shaken out as far as possible, but when it is of rosin or lead a portion of it always remains to contaminate the liquid when the coil is employed as a condenser. The pipes shown at the exhibition were, however, perfectly clean and bright inside, for they were bent on a metal mandrel a trifle larger than themselves, so that in passing through them it acted as a die to draw and polish the interior surface. The method of manufacture is as follows: A straight length of pipe, which is usually 70 feet long, is laid on a drawbench, and has inserted into it a solid mandrel rather less in diameter than itself, and curved at the end for about 90°, to the desired radius of the coil. The curved portion may be of a slightly larger diameter than the interior of the pipe, or it may be enlarged in places to draw the interior surface. The other end of the tube does not rest directly against the drawbench of the drawbench, but some loose tubular packing pieces are interposed between the two, so that the pipe may be coiled up to its extremity. The mandrel passes through the drawbench and is connected to the drawing apparatus, by which it is forcibly moved forward through the tube, while the latter is held stationary at one end. At the other end, however, the tube is obliged to curl up to allow the passage of the curved core through it, the result being that, as the mandrel advances, the pipe is bent into a helix which rolls itself along the bench until it finally slips off the end of the core and is complete.

When the coil is to be an involute the apparatus is somewhat modified. The arrangement of the tube mandrel and drawbench is the same as before, but the bench is made very narrow, its width being only equal to the diameter of the pipe. The tube, instead of being allowed to form its own figure, is wound on a drum with deep flanges. The length of this drum is only equal to the diameter of the pipe, so when one convolution has been laid upon the first, the second is obliged to mount upon the first, the third on the second, and so on, the drum rolling meanwhile along the bench and being guided by its flanges. The body of the

Paris, 1878.

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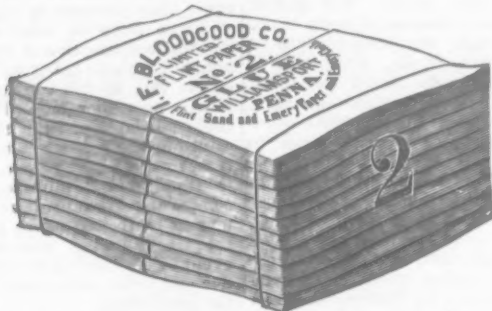
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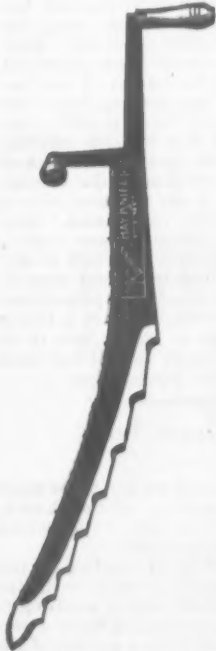
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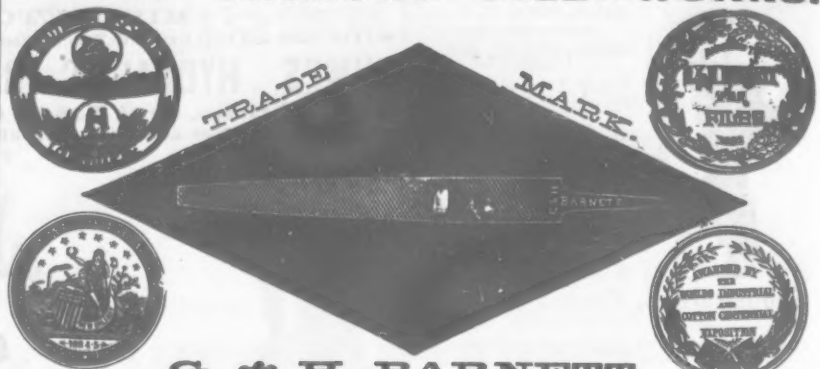
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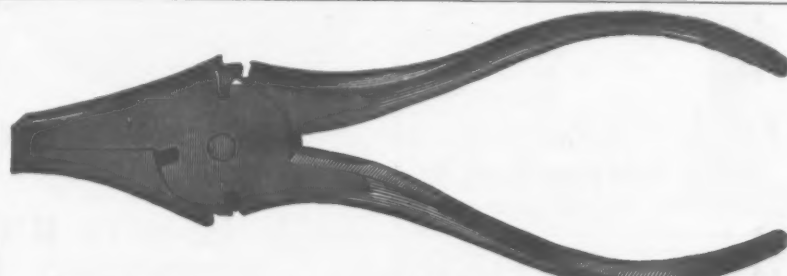
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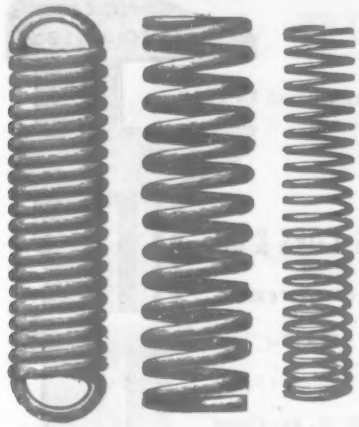
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PURE IRON ORE PAINTS,
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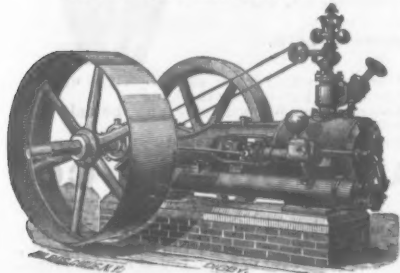
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Of all sizes and descriptions, made to order by
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 Our Springs are used by the U. S. Government and various
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 Either HORIZONTAL or VERTICAL,
 For steady every-day and all-night service, and
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IT EXCELS ALL OTHERS

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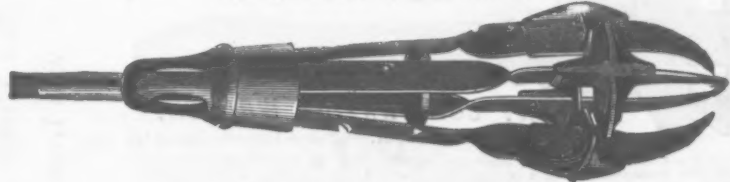
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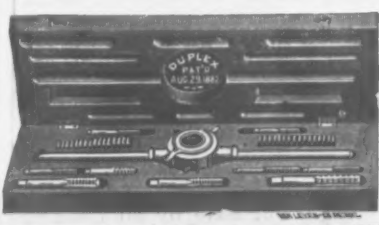
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THE NEW GIANT DRILL CHUCK
 Holds a Drill With the Grip of a Giant. All Steel.
 Parts Interchangeable.
**SIMPLE IN CON-
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 EASY TO TAKE APART AND CLEAN. BEST OF WORKMAN-
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 MOULDERS' TOOLS, AWLS, COUNTER PEG FLOATS, ORSEP MACHINES,
 METAL SPINNING AND NICKEL PLATING.
 SEND FOR CATALOGUE.

drum is of a spiral form, so that the second
 convolution is led over the first without any
 sudden bend. In making a conical coil the
 drum is of a conical form. As the tube is
 coiled on the drum by the action of the
 curved end of the mandrel, which is bent to
 the smallest radius of the coil, the drum
 rolls along the bench, and, in addition to its
 rolling motion, has a motion at right angles
 to the direction of the tube being coiled.
 The packing pieces and the drawback are
 the same as in the previous arrangements.
 By the use of other drums different figures
 can be produced, the drums being capable of
 being taken to pieces when required.

English Letter.

(From Our Regular Correspondent.)

LONDON, JANUARY 4, 1886.

THE NEW YEAR

has commenced and we have done with the
 old one. Nobody expresses any regret at
 the decease of the "old un," as Mr. Peggotty
 would have styled it. We welcome 1886 as
 being an infant of much promise. On all
 sides there is a feeling that if we have not
 really seen the worst of the depression we
 ought to have, and that, come what may,
 we cannot be worse off than we were in 1885.
 It does not follow, of course, that that view is
 correct, but, as it is held by the majority, I
 need not endeavor to confute it. It is being
 specially encouraged, moreover, by the highly
 favorable telegrams from the United States
 which are being published by some of the
 newspapers here. According to all accounts
 you are on the high road to a big boom; con-
 sequently, our iron and steel, as well as hard-
 ware, men are expecting you to fix it up in
 real good style.

Since I last wrote to you there has been
 very little business done, and the New
 Year's holidays, which involve some very
 "high jinks" in Scotland and the North of
 England, are prolonging the holidays there-
 abouts long after we Southrons have re-
 turned to our offices and works. Here and
 there a resumption has been made on a
 fairly good scale, but I do not hear that the
 general run of the iron and steel concerns
 have much work on hand with which to
 commence the year's business. Some
 branches of the trade are depressed by the
 unfavorable statistics of pig-iron stocks, but
 on the whole the returns have not had as
 serious effects as might have been antici-
 pated.

THE IRON MARKET.

in common with most other markets, has
 been very quiet all the week, as a necessary
 result of the holiday period. At Glasgow
 there has been a moderate business only in
 warrants, and the bears have the best of
 the situation, owing to the very large in-
 crease in the stocks. The closing price of
 1885 was 41/1½ per box; business then ad-
 journed until to-morrow. At Middlesboro'
 matters are very dull, and No. 3 is offered
 at rather less than 32 per ton. Nothing has
 been announced as yet in respect of the pro-
 posed further restriction of the production.
 On the West Coast values are steady at
 about 44/6 @ 45/ for mixed numbers in
 usual proportions. American inquiries con-
 tinue to come in, and it is reported that the
 sales made already reach a large aggregate
 tonnage. Elsewhere crude iron is quiet, and
 the smelters do not seem to be quite so firm
 in their views. For early deliveries current
 prices appear to be the rule. In the heavy
 and other branches of the manufactur-
 ed iron trade there is really nothing
 new to report this week. Old
 materials are rather scarce, and prices are
 firm. F. Pitts & Co. quote: Old double-
 headed iron rails, £2. 15/; No. 1 heavy
 wrought scrap, £2. 5/; old iron boiler tubes,
 £2. 2/6 @ £2. 5/; old leaf-spring steel, £2.
 15/ @ £2. 17/6; old cast iron, £1. 18/6 @
 £2, and old flange rails, £2. 12/6 @ £2. 14/,
 all f.o.b. London or other good English
 port. Freight rates are unchanged at our late
 rates, pig iron by ordinary steamers, Glas-
 gow to New York, being 7/6 @ 10/ per ton,
 according to time of shipment. Steel is lan-
 guid, and most of the Sheffield concerns
 have been idle the whole of the week. The
 Siemens and Bessemer works are pretty well
 engaged. Further large orders for steel
 sleepers for India have been placed at Eaton
 and other works. It is reported that, in
 consequence of the combination of Scotch
 steel-makers to keep up prices, a Glasgow
 firm has placed an order for Siemens steel
 ship-plates in Germany at 10/ per ton below
 Scotch quotations. Steel rails are as of late,
 but the works are better off for orders.
 Bolckow, Vaughan & Co. are not busy for
 America, as has been reported, but on rails
 and sleepers for India.

SCOTCH PIG IRON

has been depressed by the statistics of which
 I gave you a summary in my last, but has
 been bolstered up afresh by the buoyant re-
 ports from the United States. Warrants
 stand at 41/1½. Stocks have largely in-
 creased, and now stand at 670,051 tons,
 against 579,415 tons a year ago. There are
 92 furnaces at work, compared with 93 this
 date 1885:

Lanarkshire Brands.—Free Alongside Ship at
 Glasgow.

Brands.	No. 1.	No. 2.
Gartsherrie.....	45/6	42/9
Coltness.....	45/6	45/
Langloan.....	44/	44/
Shotts.....	45/6	45/6
Calder.....	50/	49/9
Summerlee.....	51/	45/
Chapelhall.....	46/	48/
Carbros.....	44/6	48/6
M. & C.....	41/	39/6
Clyde.....	45/6	41/6
Quarter.....	41/	39/
Govan.....	41/6	39/
Wishaw.....	49/6	40/6
Monkland.....	41/3	38/6

Warrants, 3-5 No. 1, 3-5 No. 2, & G.M.B., f.o.b. Glas-
 gow, 41/1½.

Ayrshire Brands.—Free Alongside Ship at
 Ardrossan.

Brands.	No. 1.	No. 2.
Glengarnock.....	45/6	41/6
Ardeer.....	45/6	41/6
Eglinton.....	41/6	38/6
Lugar, branded Eglinton.....	41/6	38/6
Mul Kirk, branded Eglinton.....	41/6	38/6
Portland, branded Eglinton.....	41/6	38/6
Dalmellington.....	41/6	40/6

East Coast Brands.—Free Alongside Ship in the
 Forth.

Brands.	No. 1.	No. 2.
Carron, selected.....	47/	46/
Carron, ordinary.....	47/	46/
Almond.....	41/	39/
Kinnell.....	44/	42/

For the following figures I am indebted to
 John E. Swan & Bros., Limited, Glasgow:

1885. 1884.

Production—As per returns from
 the makers..... 1,008,563 988,000

Consumption—In foundries, as
 per returns rec'd..... 153,597 237,000

In malleable and
 steel works..... 243,022 281,000

Total..... 396,619 468,000

Exports—Foreign, less 5700 tons
 English iron trans-
 shipped..... 267,456 319,463

Coastwise..... 102,299 197,251

Railway to England,
 about..... 14,859 17,286

Total..... 444,614 534,000

Stocks—In Messrs. Connal & Co.'s
 stores..... 665,688 576,428

In the hands of the makers
 884,995 941,577

Total..... 1,550,683 1,518,005

This shows an increase in the production
 of 15,562 tons, a decrease in the consumption
 of 72,381 tons, a decrease in the exports of
 89,386 tons, and increase in stocks of 229,683
 tons.

Number of furnaces in blast on
 25th of December..... 91 98

Average number of furnaces in
 blast for the year..... 90 95

Highest price of mixed num-
 bers G. M. B. warrants for
 the year..... 48/11½ 44/7½

Average price..... 41/20 42/1½

Lowest price..... 40/7½ 40/10

Quantity of malleable iron and
 steel made in Scotland, about,
 tons..... 441,000 387,000

Consumption of Cleveland and Cumberland
 pig iron in Scotland:

1885. 1884.

In foundries..... 270,000 234,000

In malleable iron and steel
 works..... 195,000 145,000

Total..... 465,000 389,000

Complete returns of the production and
 stocks have this year been received from the
 ironmasters, whereas for four years pre-
 viously these were only estimated. The
 actual increase of stock during 1885 is
 163,329 tons, which brings out a discrepancy
 of 66,354 tons in the above comparison, arising
 from previous underestimates.

LAST YEAR'S FAILURES

numbered 5089, as against 4394 in 1884
 (when the very stringent new bankruptcy
 act came into force), 10,599 in 1883, 11,019
 in 1882, and 12,005 in 1881. The total for
 1885 is very small, all things taken into con-
 sideration, and, even allowing for the num-
 erous cases which are arranged privately,
 shows that credit is very good and that
 operations are on a sound basis. In the
 wholesale branches of the engineering, iron,
 &c., trade there were only 78 failures, and
 in the retail branches 92 (not counting 99
 plumbers and gas-fitters), neither of which
 totals are at all serious—indeed, they are
 very small for these large industries.

MIDDLESBORO' PIG IRON

is very quiet, and will not be improved, in
 all probability, by the annual statistics due in
 a day or two hence, as stocks have grown
 very largely during the year and now reach
 about 500,000 tons. Current rates G.M.B.,
 f.o.b. at makers' wharves in the Tees, net
 cash, less 2½ discount, are as under:

No. 1 Foundry.....	34/6	Mottled.....	30/6
" 2 ".....	35/6	White.....	30/
" 3 ".....	35/	Refined metal.....	50/
" 4 ".....	31/6	Kentledge.....	35/6
" 4 Forge.....	31/	Cinder.....	30/

are steadily firm at about 44/6 @ 45/ for
 mixed numbers, West Coast makers' brands
 being as below:

	No. 1.	No. 2.	No. 3.
Cleator.....	46/	45/6	45/6
Lonsdale.....	45/6	45/	44/6
West Cumberland.....	45/6	44/6	44/
Lowther.....	45/	44/6	44/
Darlington.....	45/	44/6	44/
Harrington.....	45/	44/6	44/
Solway.....	45/	44/6	44/
Maryport.....	45/	44/6	44/

For the following statistics I am indebted
 to Messrs. Feldmann, of Whitehaven:

Statistics of Hematite Iron in West Cumberland
 and Barrow Districts.

1885. 1884. 1883.

Number of furnaces in blast,
 average..... 499 513 574

Number of furnaces in blast
 on December 25..... 41 40 56

Number of furnaces existing 79 79 81

Total make during 1885..... 1,219,300

Total make during 1884..... 1,398,000

Total make during 1883..... 1,450,000

1885. 1884. 1883.

Tons. Tons. Tons.

Stocks in makers' hands
 end of year..... 170,276 127,945 141,773

Stocks in West Cumber-
 land Storage Co.'s store
 at Workington..... 69,370 52,139 40,892

Stocks in West Cumber-
 land Storage Co.'s store
 at Maryport..... 29,302 9,759

Stocks in Northwestern
 Storage Co.'s store at
 Maryport..... 20,900

Stocks in Furness Railway
 Co.'s store at Barrow..... 78,868 69,757 27,185

Total..... 268,800 259,800 209,800

Shipments of hematite pig
 iron, 18 months, ending
 Dec. 25 (coastwise)..... 988,867 832,481 408,412

Shipments of hematite pig
 iron, 18 months, ending
 Dec. 25 (foreign)..... 104,017 187,468 288,155

Total..... 1,092,884 1,019,949 696,567

Shipments of steel rails
 and blooms (coastwise)..... 200,548 210,664 188,947

Shipments of steel rails
 and blooms (foreign)..... 67,318 66,504 97,275

Total..... 267,866 277,168 286,222

Local consumption and export by rail not
 included in these returns.

BRITISH RAILWAYS AND TRAMWAYS

Messrs. Bolling & Lowe's useful annual
 iron trade report states that at the close of
 1884 there were 18,864 miles of railway
 in operation; 604,991,860 passengers were
 carried during the year, and the earnings
 were 4.16 per cent. Of tramways and
 road railways there were on June 30, 1885,
 811 miles in operation; 364,702,307 pas-



American Made Razors
WARRANTED BEST CUTTERS IN THE WORLD.
J. R. TORREY & CO.,
J. R. TORREY RAZOR CO.
Sole Agent for Worcester Cutlery Co.
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Nicholson File Co.'s Files.
Russell Jennings' Anger Bits.
Geo. Selsor & Co.'s Hatchets, Hammers, &c.

American Screw Co.'s Wood and Machine
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Brade's Brick Trowels.
O. Ames & Son's Shovels, Spades and Scoops.
E. W. Gilmore & Co.'s Strap and T. Hinges.

GENERAL HARDWARE.

FISHING TACKLE.

IMPORTERS, MANUFACTURERS AND DEALERS IN

Fish Hooks, Rods, Reels, Silk and Linen Fish
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MANUFACTURERS' AGENTS FOR

SKINNER'S CELEBRATED SPOON BAITS,

Patent Adjustable Float and Sinkers, "Wheeler's" Split Bamboo Fishing
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Silk, Linen and Cotton Lines, "Mann's"
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Successors to BRADFORD & ANTHONY,

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Punches.

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Straight Trimmers for the money in the market - New England. We pay particular
attention to hardening and tempering our goods, and they can be relied on for possessing
superior cutting qualities. A fair trial of our goods will convince of their merit.

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Send for Illustrated Catalogue, with discount. Factory, NORFOLK, CONN.

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Manufacturers of
SCISSORS
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Scissors, Corkscrews and Hardware Specialties.

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The Best and Cheapest in the Market. Send for Prices.

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LARGEST LINE OF
WROUGHT CARRIAGE FORGING
MADE BY ANY HOUSE.

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AUBURN, N. Y.



THE F. WILSON Pat. Grinding Mill

GRINDING WET, GREEN, GREASY OR DRY BONES.

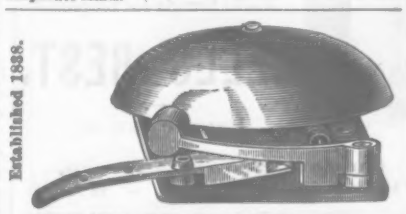
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The \$5 Hand Mill.
HAWLEY BROS. HARDWARE CO.,
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The demand for JOSEPH RODGERS & SONS' pro-
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Premises and Steam-power.
To distinguish articles of JOSEPH RODGERS &
SONS' manufacture, please to see that they bear their
Corporate Mark.



BEVIN BROS., MFG. CO., Easthampton, Conn.,
Manufacturers of
Sleigh Bells, House, Tea, Hand, Gong Bells, &c.

MONTGOMERY & CO.,

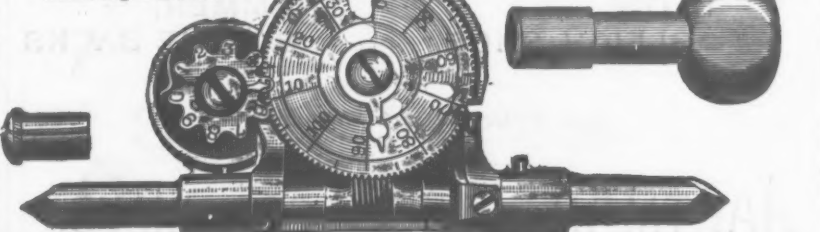
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Stubs' Files, Tools and Steel,

Grobet Swiss Files, Chesterman's Tapes, Rules, &c., Hubert's French Emery Paper,
Horseshoe Magnets, &c., Wm. Smith & Sons Celebrated Music Wire, Nos. 2 to 30,
French Sheet Steel, 3 1/4 in. wide, from 4 to 65 Thousandths.

Machinists', Silversmiths', Jewelers' Die Sinkers' and Sewing Machine Manufacturers' Supplies.

PATENTED IMPROVED
DOUBLE SPEED INDICATOR,
Either Right or Left.



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GEO. W. CHURCH,

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Bemis & Call Hardware & Tool Co.
PATENT COMBINATION WRENCH.
Case-Hardened Throughout. Parts Interchangeable.

This Wrench not only combines the superior qualities of a Pipe Wrench but also
all the requisite combinations of a regular Nut Wrench, thus making a combination
which has no equal.

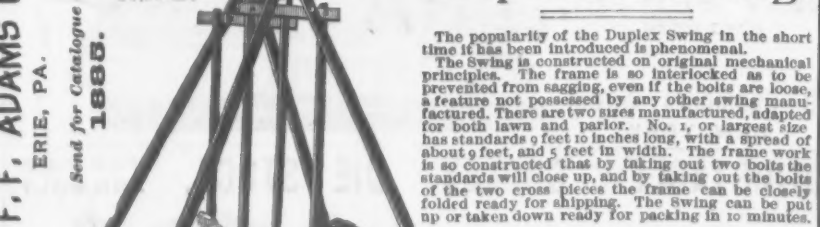


No. 3 PATENT PIPE WRENCH.

The serrated jaws of the Wrench are interchangeable; that is, the same serrated plate
may be used for either the stationary or sliding jaw, so that if one plate is broken another
can be furnished adapted to either jaw without express designation. The slides, nuts and
various parts are also interchangeable, thus easily repairing the Wrench at very small
expense, and with as perfect practicability for further use as when the Wrench was new.
For Circulars and Price List, address

BEMIS & CALL HARDWARE & TOOL COMPANY, Springfield, Mass.

Duplex Swing.



The popularity of the Duplex Swing in the short
time it has been introduced is phenomenal.
The Swing is constructed on original mechanical
principles. The frame is so interlocked as to be
prevented from sagging, even if the bolts are loose,
a feature not possessed by any other swing manu-
factured. There are two sizes manufactured, adapted
for both lawns and parlor. No. 1, or largest size,
has standards 6 feet to 10 inches long, with a spread of
about 6 feet, and 5 feet in width. The frame work
is so constructed that by taking out two bolts the
standards will close up, and by taking out the bolts
of the two cross pieces the frame can be closely
folded ready for shipping. The Swing can be put
up or taken down ready for packing in 10 minutes.

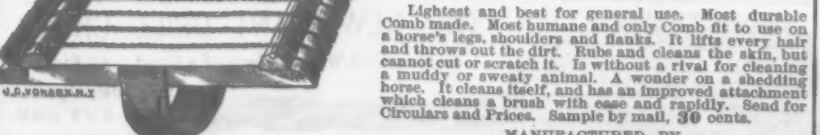
The weight of the Swing is a little
less than 100 pounds. It is very
strong, having been tested by four
men whose weight aggregated over
800 pounds.

The No. 2, or parlor size, has stand-
ards about 7 feet long, and otherwise
proportioned in size, weighing less
than 75 pounds. They combine sim-
plicity of construction, beauty and
strength, and can be operated with
ease by small children in the swing.

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New Improved Patent Wire
CURRY COMB.



Lightest and best for general use. Most durable
Comb made. Most humane and only Comb fit to use on
a horse's legs, shoulders and flanks. It lifts every hair
and throws out the dirt. Rubs and cleans the skin, but
cannot cut or scratch it. Is without a rival for cleaning
a muddy or sweaty animal. A wonder on a shedding
horse. It cleans itself, and has an improved attachment
which cleans a brush with ease and rapidly. Send for
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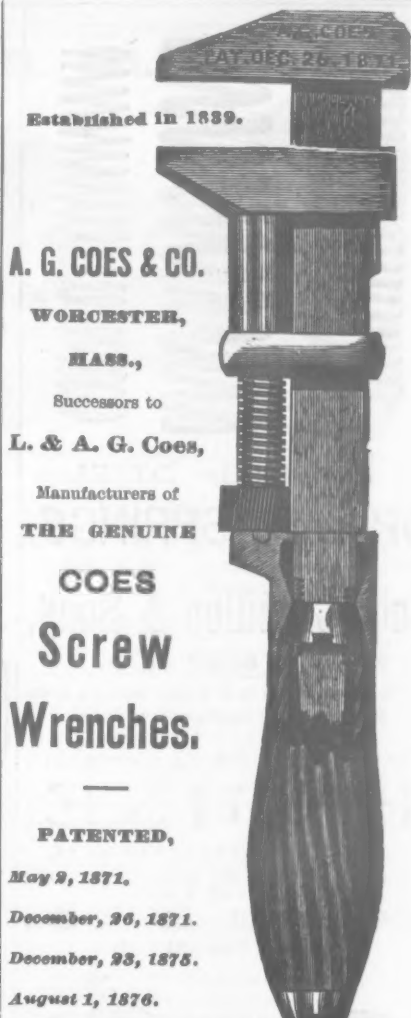
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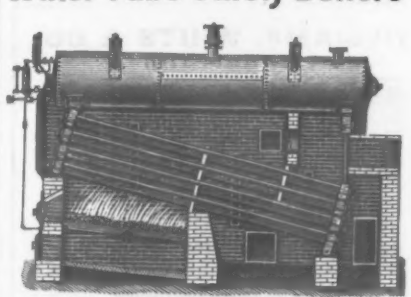
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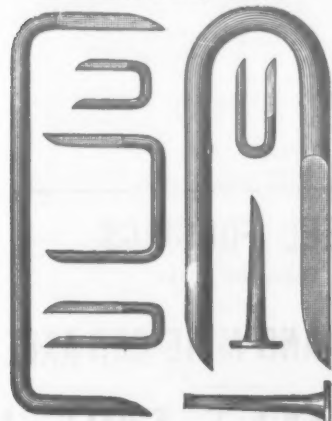


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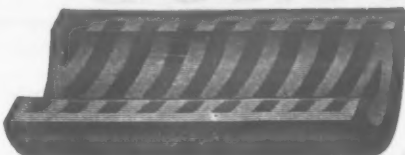
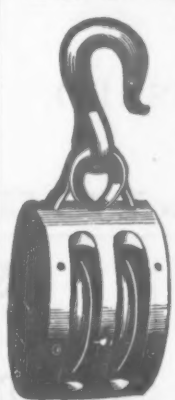
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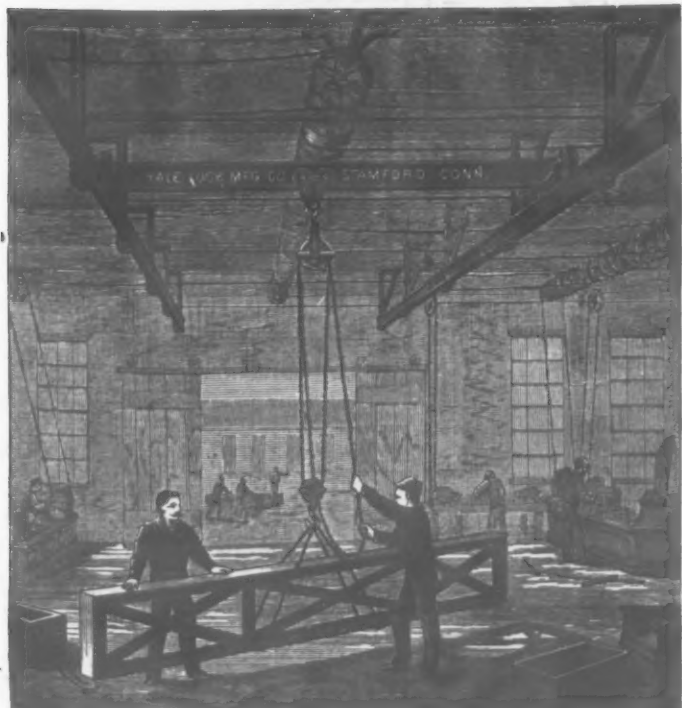
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sengers were carried in 12 months, and the net earnings were 5.40. There has been a steady development in tramways, and they are now regarded as good dividend-paying investments. The average cost per mile is decreasing and the dividend increasing, just the reverse from the railways under both these heads. In fact, tramways may gradually reach a similar position to that held by gas and water companies, being considered a necessity rather than a mere convenience.

THE HARDWARE TRADES.

At Birmingham wholesale business in nearly all the departments of trade has been practically suspended this week, and even in the retail branch there has been very little doing. Open failures are fortunately few at present, though several private arrangements are talked about, and there is an apprehension of more. In many cases where the works are now stopped operations will not be resumed until the workpeople have assented to a revision of wages, which is really a measure necessitated in the interest of the workpeople themselves in days of fierce foreign competition such as we are now passing through. At Willenhall a lock firm, which has of late years made itself thoroughly acquainted with every phase of the American lock competition, is arranging to commence the manufacture of the American pattern rim locks. They have a cast-iron ornamental case, are fitted with reversible bolt, and all the internal parts are interchangeable. The firm intend to push the new article chiefly in Australia, but also in Canada, China and other export markets. At Sheffield the prolonged holiday accords well with the convenience of the manufacturers, who find much more satisfaction in overhauling and appraising their stock than in adding to it. As a general rule stocks are not heavy, except in such branches as electro-plate. Most manufacturers in the cutlery, tool and general hardware branches have been gradually assimilating their production strictly to the amount of business coming in. It is generally hoped that the new year will be opened, industrially speaking, under rather more cheerful conditions than it closed. The American orders have been improving now for several weeks, and though there has not been the same defined movement in the trade with the colonies, there is evidence of returning vitality, indicating that the effects of the agricultural disasters of recent years have been overcome. The inquiries to hand from the Cape also seem to point to a rather better state of things. In the Eastern markets extreme quietude prevails, but great expectations are being formed by the opening of the Burmese route to China.

TIN PLATES.

In London the holidays have, of course, so interfered with business that there has been no scope afforded for any marked alteration in this market. Very little business is reported to have been done during the week, but values are steadily maintained on the basis of 14/ @ 14/6 for good ordinary brands of IC cokes, f.o.b. Liverpool. Most of the best makers are reported to be fairly well booked with orders, but some of the other makers are in want of orders to keep them from working for stock. In Liverpool the year closes badly so far as new business is concerned. This week, being New Year's week, there is the usual lull in business generally. Though there are numerous inquiries sent out, there is no regular buying going on, and the worst feature of the present state of affairs is that there are so many more sellers than buyers. The latter have been holding off for some time past and not placing any orders in a general way for the ordinary run of plates, simply contenting themselves with buying for any special orders that come to hand; yet in the face of these facts plates are being pressed on the market by several sellers. So very much has this been the case this and last week that there are good brands of coke tins to be had at 13/6, and even this price is not firm, except for several brands. There is every prospect of ordinary coke tins being down to 13/6 prior to quarter-day. Several parcels of good coke tin plates have, however, changed hands, and orders were placed this week at from 13/9 to 14/ 10. There has not been very much doing in steels lately, and more in Bessemer than in Siemens qualities. The former are now 14/ @ 14/3 10, and the latter 14/ 10; a few orders only have been placed in each brand. The competition for the orders offering is so keen that no one need be surprised at prices receding in the manner they do, and, still further yet, there has been a drop almost daily lately. The business done in charcoal tins and tines this week has not been at all large; inquiries are few and orders restricted to comparatively small quantities. The chief cause of the present depressed state of the market here is still the state of uncertainty that exists in the minds of merchants and buyers generally as to whether or not the combination to reduce the make is to be continued next year.

The Trouble With Steel Plates in England.

In its annual review of engineering for 1885 the Engineer discusses at length the question of the alleged treachery of steel plates. We quote from its remarks as follows:

Probably the most important subject connected with mechanical engineering to which we can refer is steel. No advance whatever has been made during the last 10 years toward the elimination of the treacherous characteristics of the metal, and there is no reason to anticipate that it will be better in 1886 than it was in 1885. Indeed, there is some cause to fear steel is not so good as it was. Steel made by the Bessemer process at all events does not seem to enjoy the reputation it once did. It would be interesting to know why Siemens steel has come to be regarded by boiler-makers and engineers as better, in the sense that it is more trustworthy, than Bessemer steel; and it may yet be that the product of the converter will be mainly devoted to rails and tires and axles, while boiler plates will be produced only by the Siemens process. So far as can be known, the unexpected fracture of steel plates is due to the spread-

ing of extremely fine initial cracks, and this can only, we fear, be controlled effectually by giving the plate a fibrous structure. Iron has been much abused for its laminated fracture; but it is the lamination of iron that has enabled it to attain the high position which it long held. The effect of lamination may be made clear by supposing that a boiler, instead of being built up of single plates 1 inch thick, was composed of four plates each 1/4 inch thick, put together much as the coils of a gun are. In the first case, if a crack was once developed in, say, the outside of the single plate, it would quickly spread inward, and cause the destruction of the boiler; but the outer plate of a shell built up of four plates being cracked through, the strength of the boiler would only be decreased 25 per cent., and the crack could not spread through the remaining plates. It is for this reason that we look on the metal produced by the Congreaves Co. with considerable favor. It is made by putting a number of wrought-iron rods into an ingot mold and pouring steel in. The rods become welded to the steel without losing their fibrous nature. When the ingot is rolled down this wrought iron partakes of the general reduction of section, and thus a plate or rod of very perfect mechanical texture is produced. It ought to be possible, however, to carry this system further, and to produce boiler plates in which iron shall be, so to speak, sandwiched, for the express purpose of stopping the spread of cracks. How these cracks are generated is a very important question. They may be due to the cellular structure of the ingot, the cells being, of course, due to occluded gases. Some of the cells may be quite too small for easy detection, even if an ingot was broken across, and yet develop into a dangerous crack.

The failure of certain shipplates and angles in the North of England has attracted much attention. It is not quite as easy as is desirable to get at the whole truth in these cases. Inquiries have resulted in the acquisition of information to the effect that such failures have been comparatively numerous, and that the treacherous plates and angles have been in all these recent cases made of basic steel. Such failures are not confined to basic steel. Messrs. Bolckow, Vaughan & Co. have in consequence stated that they will make no more basic plates or angles, and Lloyd's Committee have resolved not to class any ship built of basic steel, and have withdrawn their inspectors from yards where basic steel is used. This line of action must, however, be regarded as only provisional. As soon as the character of basic steel is re-established it will be accepted by Lloyd's as a material suitable for the construction of ships. For certain purposes it appears to be an excellent metal, but it requires special treatment. Lloyd's will permit boilers to be made of it, but only under certain stipulations. Its strength must not exceed about 24 tons on the square inch, and the scantlings must be augmented as compared with acid and Siemens steel standing 30 tons. In fact, it appears to resemble Low Moor or Bowling iron more than anything else. It is worth notice that Lloyd's will not pass any steel which stands more than 30 tons, and when plates exceed 1 inch in thickness the standard is lowered. In all this we find direct evidence that practical men find it necessary to employ steel with much caution, notwithstanding the admirable qualities which it displays. We understand that Mr. Parker chief engineer surveyor at Lloyd's, is now conducting a valuable series of experiments with a view to solve the steel problem and ascertain why plates break. To this end he has subjected steel plates of all kinds to the worst possible treatment—such as heating one corner while the rest is kept cool, making a hot fire on the center of a plate while a hose played on the metal outside the heated circle, and so on—but up to the present he has not succeeded in a single instance in getting a plate to crack.

It cannot be said that any failure of a steel plate is a surprise, because the treacherous character of the material under certain conditions of treatment has long been known. A valuable report to Lloyd's Committee on the Steel-Manufacturing and Engineering Works of France was prepared by Mr. Parker in 1883. This report is not as well known as it should be. Among other places visited was the naval dockyard at Toulon. There they had been long aware of the peculiarities of steel. "The French engineers," says Mr. Parker, "seem to have recognized to a greater extent than has been done in England the fact that steel requires to be treated with much more care than iron in order to preserve the normal qualities of the material in a structure, and the plate and angle shops in Toulon Dockyard are fitted with special tools, mostly hydraulic, so that it may not be necessary to hammer or distress the material in any way. These tools are so designed and the plant is so arranged that all the work necessary in either plates or angles may be done while the material is at a uniform heat, and before the temperature falls below the acknowledged dangerous limit of dark red. The frames are all heated in gas furnaces on the Gorman system, and by means of ropes, hydraulic capstans and return pulleys the frames are turned or drawn to their required curvature in a few seconds of time, without any sudden shock or jar; they are then beveled with shears, and when completed retain a sufficient heat to anneal them.

"Again, all garboard strake plates and others involving strong curvature, or sharp changes of form, that in this country are generally bent or flanged by hammers, are at these works bent to form by hydraulic presses, while all shears and punches are also worked by hydraulic power, so that there is a complete absence of jar or jerk in the speed of the tool at the moment when its edge comes in contact with the work punched or sheared, which must necessarily punish the material to a less degree than punches, presses or shears driven by mechanical gearing. Further, with a view to avoid all useless punishment to the material by punching out curves, circular and curved hydraulic shears are extensively used, and I also observed that for cutting frames, beams, &c., circular and hand saws are used

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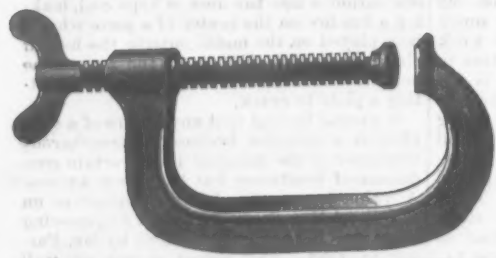
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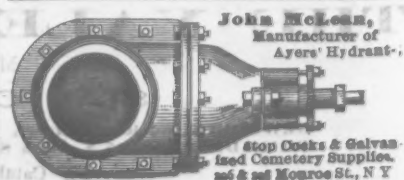
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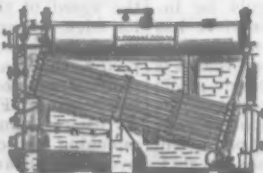


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as much as possible. In fact, wherever it is possible to replace hand-tool labor, the work of which must be rough and costly, machine-tool labor has been introduced, which is much more regular and uniform and injures the material so little that scarcely any annealing is necessary, and a fractured or cracked plate or angle, such as was so common here a few years ago, is almost unknown at these works." Further on Mr. Parker says: "In view of the valuable information and experience gained during my visit to the Toulon yard, where steel has been so largely employed for the last 10 years, I cannot but feel it is a matter for regret that upon the introduction of steel for shipbuilding and boiler-making into this country some four years ago recourse should not have been had by the society's officers to the experience of the French Government officials in the matter. If a visit had then been paid to the dockyards in France it would, I doubt not, have saved both the committee and executive a great amount of anxiety inseparable from the society's officers having had to work out for themselves the problems connected with the subject which experience alone could satisfactorily solve."

METALLURGICAL.

Six Months' Work of the North
Chicago Furnaces.

Mr. E. C. Potter, superintendent of the North Chicago Rolling Mill Co., sends us the following detailed statement of their furnace-work for the last six months of 1885, a record unparalleled in the history of blast-furnace work:

Month.	No. 5.		No. 6.		No. 7.		Totals.	
	Iron.	Coke.	Iron.	Coke.	Iron.	Coke.	Iron.	Coke.
July.....	5,559	2,127	5,532	2,105	6,075	2,012	17,166	2,078
August.....	5,467	1,967	5,510	1,994	5,978	1,875	16,955	1,947
September.....	5,735	1,981	5,883	1,968	6,488	1,897	18,106	1,947
October.....	5,478	1,954	5,827	1,948	5,989	1,941	17,294	1,947
November.....	5,796	1,954	6,126	1,966	6,242	1,877	18,164	1,932
December.....	5,752	1,912	5,987	1,911	5,936	1,892	17,665	1,905
Total.....	33,787	1,980	34,865	1,976	36,698	1,912	105,350	1,955

This shows the tons of iron produced by each furnace each month, with the pounds of coke used for each ton produced.

The Agglomeration of Iron-Ore Fines.

Some time since attention was called to the success at the Tamaris Furnaces of the Terre Noire Co., in pressing "blue billy" into bricks before using it in the furnaces. This blue billy is the residue from roasting iron pyrites in the manufacture of sulphuric acid, large quantities of it being annually obtained in England and on the Continent. A pure and rich material, it has only been used for filling, and to a limited extent in blast furnaces, where its powder form is troublesome. The Cresot Works have recently gone a step forward and have begun successfully to agglomerate ordinary iron ore fines. At Alleward they have for many years mixed spathic iron ore, and in the course of time have accumulated a large amount of fine ore, which they now utilize in the following manner: The ore is first classified in rotary screens, and it is then washed in a modification of the Lührig washer. Then it is mixed with 4 to 5 per cent. of hydraulic lime and passed into bricks in a Coffinall press built by Biétrix, of Chaleassière, the pressure being 500 to 600 nitograms per square centimeter. After a few days' drying these bricks are solid, will bear transportation well, and act well in the blast furnace.

Plant and Processes.

A machine for welding iron, and particularly for welding flues, has been patented by B. F. Lowther, of Garrett, Ind. The machine contains a vertically moving hammer carrying the upper die, between which and the hammer a cushion is interposed. The lower die for supporting the tube is likewise placed upon a cushion or spring. The power from the driving-shaft is transmitted by a belt to a loose and fixed pulley. When the belt is upon the loose pulley the hammer remains at rest, but when upon the fixed pulley the hammer and upper die are made to reciprocate and to strike the tube resting upon the lower die. The tube is passed over the mandrel in such a position that the parts to be welded will be immediately between the dies, the upper die striking rapidly upon the parts to be welded, which parts are turned as occasion demands.

J. H. Cremer, of Braddock, Pa., has patented a process of drying the air of the blast used in blast furnaces, cupola furnaces, Bessemer converters, &c. The atmospheric air contains at all times a variable quantity of watery vapor, which when coming into contact with the highly-heated coal and iron is decomposed and absorbs a large quantity of heat, besides oxidizing the metal. As the quantity of this watery vapor is not constant it produces a disturbing influence, rendered still more objectionable by reason of its variable and uncertain character. To remedy this difficulty the furnace is provided with one or more desiccating or drying chambers, through which the air supply passes, and wherein it is deprived of its moisture prior to the entry of the air into the furnace. The desiccating chambers are arranged on the regenerative plan, by means of which one or more of the chambers may be in active use, while the waste desiccants in the other chambers are restored to proper working condition.

A furnace for the manufacture of coke has been patented by H. M. Pierce, of Nashville, Tenn. The furnace is constructed with a view of avoiding loss of fuel by direct combustion of any portion of the charge, and to this effect the process is carried on by radiated heat, the heat of the evolved gases being employed to heat the whole charge uniformly. In order to avoid the deposit of tarry matter and the production of imperfectly-cooked masses at the bottom of the charge, the radiated heat is applied at such bottom. The furnace comprises a battery of coke ovens having each

a closed cooking chamber and basal combustion chamber. A receiving main extends along the ovens, while valved branch pipes join the main to each of the closed chambers. A delivery main placed parallel to and connected with the receiving main communicates with the several combustion chambers.

A rail spike patented by T. A. Davies, of New York, has a tapering shank and a head made of the form of a truncated cone. That is to say, the head is thickest where it joins the shank, and thence decreases in diameter up to its end. The axis of the head is placed at right angles to the axis of the shank, and is thus parallel with the top of the tie and with the bottom of the rail. With this construction the lower part of the head is said to have a firm bearing on the rail flange when the spike is driven either vertically or slanting. Moreover, the greatest amount of metal is placed at the junction between head and shank, which is the point where the greatest strength is required.

J. Adt, of New Haven, Conn., is the patentee of a machine for making barbed staples. The wire is first passed through an opening in the side frame, from whence it is caused to traverse a slot formed in the fixed female die. This die is provided with the bars and bevels to be formed upon the staple. The traversing male die is fixed to a reciprocating beam, to which motion is transmitted by means of a pair of cams made fast upon the driving shaft. The form of the cams is such as to cause the die to be thrust through the wire and to be withdrawn very quickly. The end of the wire impinges against a stop-piece. After the withdrawal of the male die the blank rests upon a pair of cheeks. The continued action of the machine will now cause one of the formers secured in the periphery of

of a former-wheel to strike the blank and to thus force it down between the cheeks, so as to assume the desired form.

A system of water circulation for cooling the exposed parts of tuyeres and of furnaces used for metallurgical operations has been patented by E. A. Uehling, of Bethlehem, Pa. The circulating tubes or channels are so arranged as to permit the switching out of those parts which are more exposed to the intense heat, and which are thus apt to become leaky, without interfering with the serviceableness of the entire cooling device. Two or more streams are made to circulate in opposite directions, which is said to give the most perfect results. In such opposite circulation the flow can be directed at once to and about the most exposed parts of the device to reduce their liability of burning out. Provision is made by which the total available water pressure is utilized in the circulating coil, and the water consumption is reduced to a minimum.

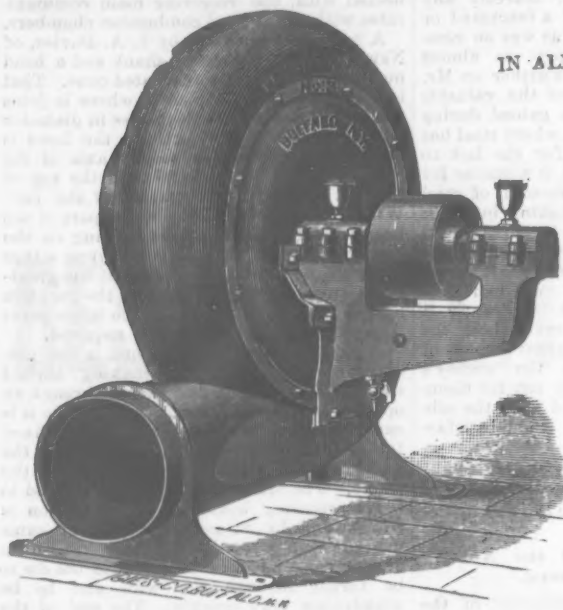
O. Murisier, of Alexandrowsky, Russia, and P. C. Gilchrist, of Westminster, England, have patented a lining for open-hearth furnaces. In the manufacture of steel in the Siemens or open-hearth furnace by the basic process much difficulty is experienced when the silica roof and sides have been allowed to rest directly upon the basic hearth, inasmuch as the silica would combine with the basic material and rapidly melt away, bringing down with it the sides and parts of the furnace. To remedy this defect the inventors employ chrome ore made plastic with tar as a separator or junction between the basic and silicious materials, such junction being preferably above the slag level. The mixture does not flux with either the basic or silica materials, and may be readily put in place by ramming in the ordinary manner, or it may be used in the form of bricks prepared by mixing the chrome ore with sufficient tar to make the mass plastic.

J. Lippincott, of Baltimore, Md., has procured a patent for a process of manufacturing wrought-iron tubing. The invention contemplates the formation of a joint which may be made without increase of cost and which will be stronger and of better finish than those heretofore made. Instead of taking a skelp of a width equal to the outer circumference of the finished tube, a skelp is used having a slightly greater width. Hence in bending the same, previous to welding the joint, the edges are brought together at their angles on a line approximating the outer circumference of the tube. When the edges are heated and subjected to welding pressure in the direction of the diameter of the tube they come together throughout their entire area, and, there being a surplus of stock, lateral compression takes place, which results in a stronger and tighter weld. The welding may be performed under the same conditions as in the case of lap welding by the use of the welding ball and rolls.

B. Atins, of Newark, N. J., has invented a mold for casting ingots composed of different metals, such as used for armor plates and similar articles. The mold is composed of a separable inner and outer chamber which communicate with ducts that lead to separate funnels. The core metal, which is preferably of a harder grade of steel than the outer layer, is poured through one of the funnels to fill the inner chamber. When the metal is sufficiently set or hardened to hold its own weight the center mold is drawn off from the core by suitable means, and at the same time steel of a different degree of hardness is poured through the second funnel and rises quickly and evenly around the core. As the core still retains a very high degree of heat, and as but little opportunity is given for the oxygen of the air to come in contact with the core, a complete and perfectly cohering weld or union of layers is said to be formed.

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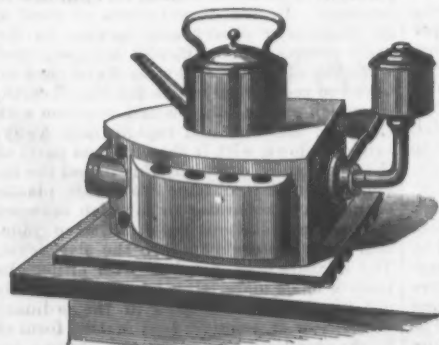
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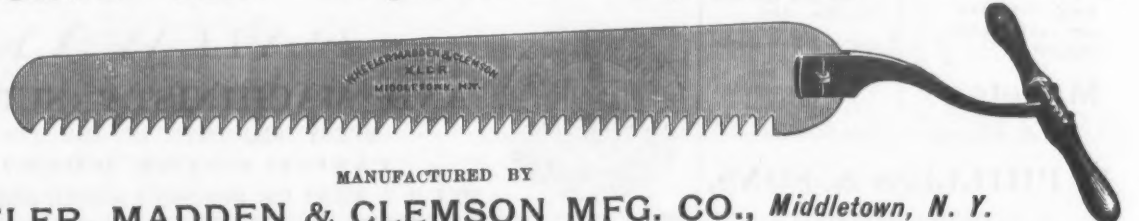
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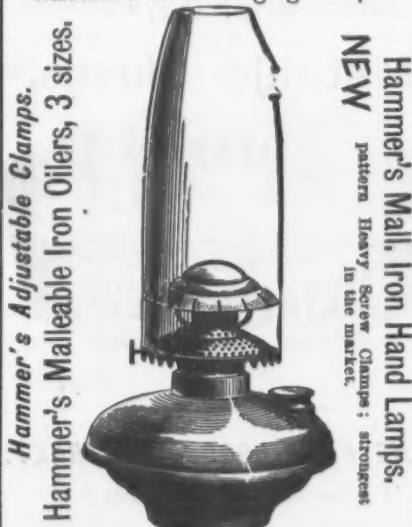
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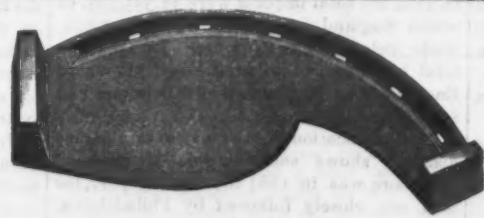
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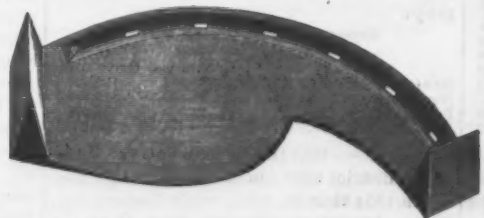
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Triple-Expansion Engines.

The first volume of the "Transactions" of the recently established North-East Coast Institution of Engineers and Shipbuilders, England, contains a paper on "Triple-Expansion Engines," by Mr. Taylor, which is well worth notice. Mr. Taylor was one of the first engineers to make triple-expansion engines a success at sea, and what he has to say on the subject, therefore, claims attention. Mr. Taylor attributes the superior economy of triple-expansion engines to the fact that larger measures of expansion may be used with it without entailing disastrous cylinder condensation than is possible with any other form of engine, and apparently to nothing else. He asserts, also, as do many other engineers, that this result is due to the smallness of the range of temperature in each cylinder. In other words, the triple-expansion engine enables the heat-trap theory to be applied in practice to a greater extent than is practicable with the ordinary compound engine. Referring to this point the London Engineer some months ago undertook to prove that the economy of the triple-expansion engine is due to an entirely different cause.

If steam could be used in a cylinder of slate or other material which did not take up or give out heat, remarked our contemporary at the time, it would, according to the accepted bases of thermo-dynamics, behave very nearly like a permanent gas. If it was so far superheated that none of it would be condensed in the performance of work, it would behave precisely like a permanent gas, and the consumption of coal as compared with the very best engines now running would be reduced by about 25 per cent—that is to say, an engine now burning 100 tons in making a given voyage could do it under the new conditions with 75 tons. This result would be due entirely to the circumstance that there would be no condensation and no re-evaporation in the cylinder. We say "cylinder" advisedly, because no advantage of any kind in the way of economy of fuel could then be derived from the compound principle. The turning moments would be more irregular, and the strains more severe, and the valve gear more complex, but with these things we have nothing to do at this moment.

According to the heat-trap theory the quantity of steam condensed in an engine is determined, other things being equal, by the difference between t and t' , or the initial and terminal temperatures in the cylinder. If, for example, we use steam with an absolute pressure of 175 pounds on the square inch, and expand it 10 times, the values of t and t' will be respectively 371° and 221° . If the engine is fitted with a condenser the value of t' will fall to about 120° . Deducting 120° from 371° , we have 251° as the range of temperature. Assuming, for the sake of argument, that the crank-shaft makes 100 revolutions per minute, then the cylinder will alternately be heated and cooled 100 times in a minute; and it is usually assumed that the average temperature of the cylinder will be a mean between t and t' , or, let us say, 245° . This is the temperature of steam with an absolute pressure of 30 pounds on the square inch. The absolute average pressure proper to a tenfold expansion of 175 pounds steam is 57.75 pounds, corresponding to a temperature of 290° —that is to say, 41° higher than the average heat of the metal. From this it would appear that there must be a direct loss of heat under any possible circumstances; or that, in other words, the cylinder will always condense more steam than it can re-evaporate—a result due to the fact that the time during which the temperature is high within the cylinder is less than that during which it is low, because it is open to the condenser temperature of 120° during a whole stroke, and open to the boiler temperature for only a fraction of a stroke.

There is, however, practical reason for believing that this line of argument is deceptive, and that in every steam cylinder it will be found that the re-evaporation will very nearly balance the condensation provided the loss by external radiation is disregarded or prevented. If this were not the case, water would always be found free in engine cylinders; but it is well known that under certain conditions the steam, even with unjacketed cylinders, is quite dry. It is clear that in an engine running at a good speed the temperature of the cylinder metal can never either fall to that of the condenser or rise to that of the steam, save for a very small thickness indeed; and if it can be shown that the energy of steam is greater to heat up than that of the condenser is to cool down, the average temperature of the cylinder may be sufficient to insure complete re-evaporation. That the point is in favor of steam is demonstrated by the circumstance that the cylinder is always hotter than the condenser. It is evident that the influence which mere surface bears on cylinder condensation must be very great indeed. When steam enters the cylinder the heat proceeds outward through its walls. The moment the steam port closes and expansion commences, it will begin to travel back again, and the thickness of metal thus affected will depend materially on the rate at which the alteration of temperature occurs. In any screw engine, at all events, it may be taken as proved that surface is a most potent factor in fixing the quantity of steam that shall be condensed or re-evaporated.

It requires no genius to see that the surface in a compound engine is very much greater than the surface in a non-compound. For example, let us take the case of a triple-expansion engine with cylinders 23 inches + 37 inches + 58 inches \times 36 inches. The whole of the power may be referred to the low-pressure cylinder. Its surface will be, in round numbers, about 131 square feet. This is counting two piston faces, two cylinder covers and adding about 10 per cent. for ports, clearance, &c. The intermediate cylinder, in like manner, will have a surface of 65 square feet, and the high-pressure cylinder will have a surface of 33 square feet. The total cylinder and piston surface of the engine will be $130 + 65 + 33 = 228$ square feet, or $65 + 33 = 98$ feet more than the non-compound engines. It is not possible to give precise figures in this connection, but let us, for the sake of argument, say that

the condensation will be as the surfaces multiplied by the range of temperature. The total expansion will be about thirteen-fold if steam follow the high-pressure piston half stroke. Then we shall have for the non-compound engine $365 - 150 = 215$, and $215 \times 130 = 27,950$, which we shall call the coefficient of condensation. It must be understood that this does not represent heat-units. It is simply a number intended for comparison, and nothing more.

Treating the engine as triple expansion, and taking Mr. Taylor's temperatures as given for the steamship Isle of Durey, we have for the small cylinder a range of temperature of about 60° , and $60 \times 33 = 1980$. In the intermediate cylinder the range will be about 67° , and $67 \times 65 = 4355$. In the low-pressure cylinder the range will be 105° , and $105 \times 130 = 13,650$. Adding these three coefficients together, we get 19,985, as against 27,956 for the non-compound engine. From which it appears that the entire saving due to the heat traps is at the most about 29 per cent, whereas those who mostly believe in the theory seem to persuade themselves that there is next to no condensation at all in the triple engine, as compared with the non-compound engine; and it must be clearly understood that this 29 per cent. does not represent 29 per cent. saving in fuel or anything like it. It could only do this under impossible conditions—namely that no re-evaporation ever took place during the period of expansion.

So far we have dealt with the question of cylinder condensation from what may be regarded as a theoretical point of view. The practical aspect of the case is that there is some special condition or factor operating to cause cylinder condensation which is not fully explained by theory. In spite of the advantage apparently gained from the use of more than one cylinder, the fact is that condensation seems to be augmented rather than diminished. There is no obvious reason why as much as 43 per cent. of all the steam that enters the high-pressure cylinder of a compound engine should be condensed; but if indicator diagrams tell any truth, the condensation does reach, and even exceeds, that point. In Mr. Perkins's triple-expansion engine the condensation reached as much as 47 per cent., although the cylinder was jacketed. In the discussion Mr. Heck called attention to Mr. Seaton's paper read before the Institute of Naval Architects. Mr. Seaton stated that the results which he had obtained from a three-cylinder engine, with steam at from 100 to 110 pounds pressure only, were almost as good as those which he obtained with 160 pounds. Accordingly he had reduced his pressures, and he found that he did just as well with 140 pounds as he did with 160 pounds. This is very important testimony, as Mr. Seaton probably knows as much about triple-expansion engines as any other engineer.

The fact is that the heat-trap action of multi-cylinders has little or nothing to do with the economy of the compound or triple engine. It will suffice to say here that cylinder condensation is not an evil, provided all the condensed steam is re-evaporated under conditions which will permit it to be usefully employed. It is no more an evil than a fly-wheel is an evil; and the triple-expansion engine supplies more facilities for using initially condensed steam to advantage than the simple engine does.

Instructors for Technical Schools.

Prof. Robert H. Thurston, of the Sibley College of Mechanical Engineering, Cornell University, Ithaca, N. Y., has issued a circular in which he says:

I am frequently called upon to give advice in the selection of men, technically educated, for various positions of importance and of responsibility, sometimes in instruction in the several departments of the schools of manual training, of trade education or of schools of engineering; sometimes as teachers of pupils or as superintendents of such schools; often as professors of engineering in one or another of its principal divisions; occasionally for more responsible positions. Such men, possessing the qualifications requisite in education, training, experience, age and discretion, are exceptionally difficult to find, and I would take it as a favor if you would at any time send me the name and address and the outline of the earlier experience of any one who may appear to you to be specially well fitted to do good work in such positions. Opportunities are continually opening to men of the right stamp in the development of technical schools throughout the country. The number of such men required in the work will continually increase, and the extreme rarity of the combination of character, knowledge, presence and tact essential to success will make it more and more certain that the few possessing it will be given great opportunities to do good work.

The best plant at present known for consolidating by the interlacing of its roots the loose soil of a newly-made embankment is, according to M. Cambier (of the French railway service), the double poppy. While the usual grasses and clovers need several months for the development of their comparatively feeble roots, the double poppy germinates in a few days, and in two weeks grows enough to give some protection to the slope, while at the end of three or four months the roots, which are 10 or 12 inches long, are found to have interlaced so as to retain the earth far more firmly than those of any grass or grain. Though the plant is an annual, it sows itself after the first year, and with a little care the bank is always in good condition.

Important changes are taking place in our local flour trade. Western millers will no longer be accommodated with free storage in the great elevators connected with the railroad terminal, much to the dissatisfaction of the warehousemen, who, under the system to take effect January 21, have been losing the storage of about 250,000 barrels, or, say, \$75,000 per annum, calculated at an average of 30 cents per barrel. When the Baltimore and Ohio opens up its facilities at Staten Island the new rules may undergo considerable amendment.

The Iron Age

AND
Metallurgical Review.

New York, Thursday, January 21, 1886.

DAVID WILLIAMS, Publisher and Proprietor.
JAMES C. BAYLES, Editor.
JOHN S. KING, Business Manager.
CHAS. KIRCHHOFF, Jr., Associate Editor.

RATES OF SUBSCRIPTION, INCLUDING POSTAGE.

THE UNITED STATES, BRITISH AMERICA AND
SANDWICH ISLANDS.

Weekly Edition.....\$4.50 a year.
Issued every Thursday morning.

Semi-Monthly Edition.....\$2.30 a year.
Issued the First and Third Thursdays of every month.

Monthly Edition.....\$1.15 a year.
Issued the First Thursday of every month.

TO ALL OTHER COUNTRIES.

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Weekly Edition: \$5.00—£1—25 francs—20 marks—12 florins—6 roubles (coin)—35 lire—30 pesos.

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In any part of the world may obtain *The Iron Age* through the American News Company, New York, U. S. A.; the International News Company, New York, U. S. A.; and London, England; or the San Francisco News Company, San Francisco, Cal., U. S. A.

RATES OF ADVERTISING.

One square (12 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$40.00; payable in advance.

BRITISH AGENCY.

Office of THE IRONMONGER, 42 Cannon St., London.

DAVID WILLIAMS, Publisher,
83 Reade Street, New York.

PITTSBURGH.....77 Fourth Avenue.
JOS. D. WEEKS, Manager and Associate Editor.

PHILADELPHIA.....320 South Fourth Street.
THOS. HOBSON, Manager.

CHICAGO.....36 and 38 Clark St., cor. Lake.
J. K. HANES, Manager.

CINCINNATI.....15 West Third Street.
HENRY SMITH, Manager.

CHATTANOOGA.....Ninth and Carter Streets.
S. B. LOWE, Manager.

The Business Outlook.

Those who were most elated and most sanguine a few months since concerning the business outlook appear to be now the very ones who are discouraged and gloomy. Facts which were then utterly ignored are now dwelt upon with curious emphasis. Those who pin their faith to Wall street, or at least during the fall boom there were urgent in insisting upon the importance of the street as a factor, will find it a somewhat uncomfortable argument now. Then, we all know, our grain was being held too high to sell abroad; then it was a fact widely appreciated that the time would come when we would become exporters of gold unless our goods were more freely marketed. The silver question was as troublesome and as threatening as it is to-day. There were a number of ambitious politicians and writers who were trying to stir up a tariff agitation. These were calmly pushed aside as insignificant, and only one argument was listened to—the settlement of the trunk-line difficulties. The only new feature in the situation of an unfavorable character is that the Baltimore and Ohio Railroad is on the war-path. This is disturbing, no doubt, but it does not warrant so complete a revolution of sentiment as seems to have taken place in some quarters.

While the tone in speculative circles has an undoubtedly potent influence upon business generally, it will not do to overrate it. A study of the situation, calmly made, will, we feel convinced, clearly show that very substantial progress has been made during the past few months, and that among other industries the iron trade has moved in a very encouraging manner. There has been a hardening of values all along the line. It has been irregular, it is true, but with one or two exceptions every branch has been able to record some improvement. The boom talk has disappeared, and at the same time the pessimistic views of those who could not forget years of declining prices. The result is a more quiet, but far more general and determined, feeling of confidence in the future. There are some substantial grounds for this welcome change. From the West come reports which seem to place beyond a doubt the estimate that at least 6000 miles of railroad will be built in 1886, nearly double of that constructed in 1885. Other authorities place the figure much higher. It is known that in certain sections of the West, and notably in Kansas, preparations are being made for new construction on a scale which makes it appear like a craze to the more conservative. Local authorities are pledging their credit right and left, and already warning voices are heard. From every section of

the country nearly come reports that the railroads have already or are about to place orders for the renewal of rolling stock. We know how heavily they have bought of rails, contracts aggregating 670,623 tons having been placed up to January 1, and to date fully 700,000 tons. There can be no doubt that there will be much more work for our iron and steel mills in 1886 than they got in 1885, and, though considerable capacity is still idle, it can only come into the market after further advances have taken place.

It is now pretty clearly realized that the improvement which has already set in can only grow slowly. Nothing is more ardently desired by those in the trade, and all indications point to it. Any sudden advances would simply afford the English holders of the unparalleled stocks in that country an opportunity to unload a part of their burden. To a moderate extent we have allowed work to go there which might have been reserved for home works had not the rail market gone up too rapidly. That error should not be repeated in other lines. In the case of one or two organizations of branches of the trade a disposition has become apparent to decree advances too frequently, and in amounts entirely too great for safety.

While it cannot be denied that a bear period in speculative circles would prove a set-back to the iron trade, so much work seems assured that no serious fears of an entire collapse should be entertained in the iron trade.

Commerce of the United States in the Fiscal Year 1885.

Although it records the facts of a somewhat remote past, since it covers the period from June 30, 1884, to June 30, 1885, a volume just issued by the Bureau of Statistics possesses considerable interest. It reveals, so far as it is possible to show it, the source of our imports and the destination of our exports. In many cases the material we purchased was produced in countries other than those from which it was shipped, and the goods we sent abroad, while consigned to a harbor in one country, really passed through it in transit only, to be consumed elsewhere. This is particularly the case with the shipments from and to ports in Belgium and Holland. It is true also with some classes of merchandise which we send to or receive from Great Britain. These facts should be borne in mind when studying the table submitted, and we shall point out the most striking instances as they come up for notice.

Turning, then, first, to the imports of iron and steel and its manufactures, we have the following table of the source of the iron ore imported in the fiscal years 1884 and 1885:

Country from which imported.	1884.		1885.	
	Gross tons.	Net tons.	Gross tons.	Net tons.
France.....	4,556	4,574	4,556	4,574
Belgium.....	56,448	55,390	56,448	55,390
Germany.....	2,850	2,850	2,850	2,850
England.....	7,835	11,800	7,835	11,800
Canada.....	27,083	47,860	27,083	47,860
British Columbia.....	2,022	1,962	2,022	1,962
Italy.....	57,664	16,213	57,664	16,213
Greece.....	12,530	6,684	12,530	6,684
Portugal.....	6,299	6,684	6,299	6,684
Azore, Madeira and Cape Verde Islands.....	36,647	36,647	36,647	36,647
Spain.....	374,943	243,906	374,943	243,906
Cuba.....	28,209	28,209	28,209	28,209
Turkey in Asia.....	4,875	4,875	4,875	4,875
Total.....	553,806	428,470	553,806	428,470
Value.....	\$1,317,516	\$903,506	\$1,317,516	\$903,506

A number of less important countries have been neglected. Spain, it will be observed, still leads, though there has been quite a falling off. The same is true of the Algiers, Greek and Sardinian mines. Cuba as yet is unimportant.

Only a few countries send us pig iron, as the following table will show:

Country.	1884.		1885.	
	Gross tons.	Net tons.	Gross tons.	Net tons.
Belgium.....	4,406	5,050	4,406	5,050
France.....	584	164	584	164
Germany.....	6,396	8,093	6,396	8,093
England.....	153,748	80,844	153,748	80,844
Scotland.....	96,300	51,134	96,300	51,134
Ireland.....	4,040	1,404	4,040	1,404
Netherlands.....	1,301	5,639	1,301	5,639
Sweden and Norway.....	1,872	1,171	1,872	1,171
Total.....	288,172	151,059	288,172	151,059
Value.....	\$4,382,598	\$2,089,263	\$4,382,598	\$2,089,263

The pig iron from Belgium, Germany and the Netherlands is probably exclusively German spiegel. The receipts from France are high-grade ferromanganese, which is indicated by the fact that the 524 tons brought in in 1884 were valued at \$36,688, and the 164 tons in 1885 at \$9488. A good deal of the English pig is also spiegeleisen, the balance being open-hearth Bessemer pig and Scotch.

In scrap iron and scrap steel, of course a large number of countries contribute, the majority of them in small quantities. This is illustrated by the following table:

Country.	1884.		1885.	
	Scrap iron, Gross tons.	Scrap steel, Gross tons.	Scrap iron, Gross tons.	Scrap steel, Gross tons.
Argentina R.....	2,300	1	2,300	1
Belgium.....	1,356	197	1,356	197
Brazil.....	1,181	2,251	1,181	2,251
Chili.....	2,567	737	2,567	737
Germany.....	8,573	308	8,573	308
England.....	12,764	4,184	12,764	4,184
Scotland.....	200	1,164	200	1,164
Ireland.....	1,390	1	1,390	1
Nova Scotia.....	1,218	1	1,218	1
N. Brunswick.....	1	5	1	5
Canada.....	4,357	2,306	4,357	2,306
B. East Indies.....	6,634	3,039	6,634	3,039
Netherlands.....	2,484	1	2,484	1
Total.....	46,506	8,000	46,506	8,000
Value.....	\$633,106	\$142,937	\$633,106	\$142,937

In bar iron the bulk of the material comes from Sweden, only small quantities being sent by other countries. The details are shown in the following table:

Country.	1884.		1885.	
	Net tons.	Net tons.	Net tons.	Net tons.
Belgium.....	1,825	1,379	1,825	1,379
Germany.....	810	2,245	810	2,245
England.....	8,570	8,678	8,570	8,678
Scotland.....	890	82	890	82
Sweden and Norway.....	33,116	29,279	33,116	29,279
Denmark.....	914	914	914	914
Total.....	43,216	36,687	43,216	36,687
Value.....	\$1,742,066	\$1,436,969	\$1,742,066	\$1,436,969

The bar iron reported as coming from Denmark is probably Swedish iron transhipped.

Cotton ties are almost exclusively sent us from England, only a few tons coming from Belgium and Germany. The total amount in 1884 was 17,534 tons, and 19,047 tons in 1885.

In steel ingots, blooms, billets, slabs and bars we have the following figures:

Country.	1884.		1885.	
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Belgium.....	523	1,340	523	1,340
Germany.....	2,249	5,033	2,249	5,033
England.....	18,400	9,300	18,400	9,300
Scotland.....	62	1,738	62	1,738
Sweden and Norway.....	1,141	1,448	1,141	1,448
Total.....	22,435	19,016	22,435	19,016
Value.....	\$1,457,187	\$1,040,190	\$1,457,187	\$1,040,190

The most striking fact proved by this table is the heavy falling off in the receipts of steel bars from England, the bulk, of course, being crucible steel. To what extent this decline is disguised by an increase in the imports from that quarter in open-hearth and Bessemer blooms and billets it is, of course, impossible to state. That such an increase may have taken place is shown by the increase in the imports from Belgium, Germany and Scotland, which we know are exclusively open-hearth and basic Bessemer steel, in the form of blooms and billets.

Our imports of sheet, plate and taggers iron, amounting in 1884 to 9233 net tons and to 6780 tons in 1885, come from England, with the exception of 1919 net tons in 1884 and 2104 net tons in 1885 of Russia sheet, which appears to be the entire consumption in the country of the genuine Russian material.

Tin plates, of course, come only from England, or to a small extent in transit through Canada. So far as values are concerned, wire rods are next in importance. The following is the source of the quantities imported in the fiscal years 1884 and 1885:

Country.	1884.		1885.	
	Net tons.	Net tons.	Net tons.	Net tons.
Belgium.....	36,166	23,370	36,166	23,370
France.....	973	112	973	112
Germany.....	20,654	66,298	20,654	66,298
England.....	10,577	8,086	10,577	8,086
Scotland.....	52	1,340	52	1,340
Netherlands.....	8,553	9,248	8,553	9,248
Sweden and Norway.....	24,155	21,082	24,155	21,082
Total.....	96,881	129,770	96,881	129,770
Value.....	\$3,348,222	\$3,848,536	\$3,348,222	\$3,848,536

Germany, it will be observed, practically monopolizes the business of ordinary Bessemer rods, the balance being chiefly high-quality Swedish rods, which it will be noted are still received in heavy quantities.

In cutlery England has been losing ground. In 1884 we received from there \$1,060,390 out of a total of \$1,917,900, Germany sending \$826,316 worth. In 1885 the total dropped to \$1,438,587, of which England shipped \$708,967, while Germany stood \$698,625. In firearms Belgium is similarly forging ahead, relatively speaking. In 1884 the total imports were \$1,355,335, of which England is credited with \$771,624, while Belgium has \$528,519. In 1885 the total had dropped to \$1,169,292, of which England sent \$617,266, while Belgium had \$463,966.

The classification of the imports by customs districts shows some figures of interest. Baltimore was in 1884 the leading port for iron ore, closely followed by Philadelphia. Since then it has dropped away considerably. Thus we have for the years 1884 and 1885:

Customs district.	1884.		1885.	
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Baltimore.....	29,714	90,127	29,714	90,127
New York.....	29,340	19,231	29,340	19,231
Perth Amboy.....	21,529	55,578	21,529	55,578
Philadelphia.....	20,754	200,255	20,754	200,255

This shows that the furnaces of the Pittsburgh district used much less of foreign iron ore in 1884 than in 1885, while Eastern furnaces, importing through New York or Perth Amboy, handled more.

For pig iron we have the following distribution:

Customs district.	1884.		1885.	
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Baltimore.....	19,417	5,017	19,417	5,017
Boston.....	27,252	19,161	27,252	19,161
New York.....	178,674	99,984	178,674	99,984
Philadelphia.....	29,592	19,731	29,592	19,731
San Francisco.....	16,315	6,659	16,315	6,659
Willamette, Ore.....	4,732	631	4,732	631

It will be observed that New Orleans as a market for foreign iron is now captured entirely by the Southern furnaces.

Boston received a very large proportion of the foreign bar iron—17,663 net tons in 1885, against 21,000 net tons in 1884, the bulk of the balance coming into New York. Cotton ties, of course, go chiefly to Southern ports, as will be seen by the following table:

Customs district.	1884.		1885.	
	Net tons.	Net tons.	Net tons.	Net tons.
Charleston.....	190	1,408	190	1,408
Galveston.....	2,673	4,021	2,673	4,021
Mobile.....	848	1,340	848	1,340
New Orleans.....	9,383	6,338	9,383	6,338
Savannah.....	1,285	572	1,285	572
Wilmington, N. C.....	683	840	683	840
Besford, S. C.....	672	672	672	672
New York.....	1,486	4,343	1,486	4,343
Boston.....	81	811	81	811

The figures for tin plate derive special attention because they exhibit the growing tendency to import direct in bond to Western cities:

Customs district.	1884.		1885.	
	Net tons.	Net tons.	Net tons.	Net tons.
Baltimore.....	28,822	28,126	28,822	28,126
Boston.....	13,200	18,254	13,200	18,254
Chicago.....	8,435	19,866	8,435	19,866
Milwaukee.....	542	1,574	542	1,574
Buffalo.....	1,210	1,469	1,210	1,469
New Orleans.....	5,421	19,583	5,421	19,583
Philadelphia.....	14,006	19,583	14,006	19,583
Oregon.....	2,332	2,156	2,332	2,156
Portland and Falmouth, Me.....	6493	1,405	6493	1,405
San Francisco.....	6486	6,907	6486	6,907
Willamette.....	598	502	598	502
St. Louis.....	3,433	3,433	3,433	3,433

Small quantities were besides imported direct into Cincinnati, Detroit, Huron (Mich.), Louisville, Indianapolis, and Pittsburgh. It will be observed that Chicago, Milwaukee and St. Louis increased their direct business from roughly 6000 tons to over 25,000 tons in one year. While the total quantity of tin plates imported remained nearly stationary at about 254,000 net tons, New York handled considerably less in the last fiscal year. The same, though, is being done, but to a less noticeable extent, in wire rods. For the first time Pittsburgh appears with a direct importation of 3172 net tons and St. Louis with 1784 tons in 1885.

The Russian Iron Trade Conference.

It is a somewhat difficult matter at this distance to obtain a clear idea of the purposes and of the achievements of the conference of the Russian ironmasters, held during the close of last year. The accounts that come to us directly and indirectly are strongly colored with partisanship. They are clearly tainted either with prejudice in favor of the producers of other countries or of one section of Russia. In the case of Russian journals, the comments are inspired by a captious criticism of the attitude of the Government, or are dictated by a blind acquiescence in everything that is done officially. The fact is that the Russian iron trade is sharply divided by conflicting interests into at least three parties. One of them, the most aggressive, consists of the iron works in the Oural district. Being a purely native industry and largely under the control of the Crown, it has that powerful backing which home industry naturally and justly commands. The interests of this party lie more in the direction of producers of pig iron. A second party is composed of the iron and steel works, largely controlled by English and French capital, which depend upon foreign raw material as the basis of their operations. The third consists of the Silesian ironmasters who, to evade the increased duties imposed a few years since, built branch works on the other side of the border, in Poland, with the object of keeping control of markets once conquered.

In spite of gradually increased duties, the Oural ironmasters found it impossible to compete. This was partly due, of course, to the steady decline during the past few years of the English market, but chiefly to the fact that the Oural works thus far depend upon charcoal as a fuel, the coal deposits of that section of the country not having been developed until now. Another reason put forward by the Oural ironmasters for their distressed condition is that the Government discriminates against

written consent of the company to any change in the title, however slight, where a mortgage is placed on the property.

In quite a number of recent cases the question has been raised, and it is a very important and practical one, as to what effect a sale by one partner to another of the former's interest in the business will have on a policy of insurance previously taken out on the firm property by all the partners. It is probable that under any circumstances the remaining partners could recover their interest in case of loss, but was the sale by the other partner to his copartner an alienation or sale under the clause of the policy forbidding a sale? Of course the outgoing partner can obtain nothing, for he has parted with all his interest. The point arises in regard to the partners who have bought him out. In New York the question has been decided both ways, but it is now settled in this State that the remaining partners can recover the entire amount of loss under the policy. In Pennsylvania, however, the opposite prevails. The policy becomes void. The appointment of an assignee in bankruptcy also has the effect of making the policy void, because the title to the insured property passes from the debtor to the assignee. It is not precisely a sale, but it certainly is an alienation within the meaning of the policy. Where a general assignment for the benefit of creditors is made by a debtor holding a policy there is considerable difference in the law of the different States on the point whether this makes the policy void. In New York it does not. The

idle day, however, will not be permanent, and it is therefore fair to assume that the ovens of the Connellsville coke region, for the first time in several years, would be again fully in blast should the labor difficulty be settled. That had already increased the number of idle ovens to 3163 on the 19th inst. During the year past prices have been maintained, the rates being \$1.20 per ton for furnace coke, f.o.b. at ovens, and \$1.40 for foundry coke. As yet there has been no advance in these rates, notwithstanding the increased demand for coke, the syndicate having pursued a very conservative course in this direction; but if the present increased demand continues it is fair to presume that in the near future, or possibly at the beginning of the next syndicate year, which is now but a little way off, the price of coke will be somewhat advanced. This advance may be necessitated, and possibly precipitated, by the agitation of the wages question that is now in progress in the region, the men demanding an advance in the rates paid. The Knights of Labor have six assemblies there, with about 1500 members, who are moving in this matter. The great difficulty in the way of the success of strikes in this industry, however, is the influx of foreign labor. The work does not require very great skill, most of it being not above the grade of common labor. The latest dispatches show that the strikers are developing a belligerent spirit, and a reign of terror seems to impend.

The Connellsville coke region still holds its own, though some other regions are

Coal for a ton of coke.....\$0.28
Drawing and loading......35
Hauling and incidentals.....10
Repairs......10
Total.....\$0.83
Add interest on capital, and allowance for coal used, 32 cents; total, \$1.15.

Fluctuations in Copper and Lead.

In the accompanying diagram we show the fluctuations in the prices of copper and lead for a series of years, based upon the monthly highest and lowest quotations in the open market. Thus a double line is obtained, which at the same time expresses graphically to some extent whether or not the markets were agitated or steady. Where the upper and the lower limit lie close to one another for a long period the market was quiet, while widely diverging lines indicate a more excited state of affairs. In the case of copper it should be noted that the prices realized by the copper producers are far from being as high as the market quotations would indicate. For years the prices for export were considerably lower, and at one time the pool sales to consumers were made to include a few dealers who were bound to sell at a minimum advance at least. Then, again, early in 1885 the price to large consumers was based on a sliding scale depending upon the price of Chili bars in London, which made the copper so sold so low that it may be questioned whether, taking these sales and the export contracts into consideration, the average price realized was more than 10 cents for Lake for the whole year.

Our diagram shows, too, the growth in the production of the two metals, the figures accepted by the United States Geological Survey having been taken as the basis. The

work entitled "Die Staubinhalations-Krankheiten." These tables, which, however, do not embrace statistics of some of the most unhealthy occupations, such as the manufacture of white lead, powder and colors, lead to the conclusion that mineral dusts are in all cases the more dangerous ones. Thus it has been found that among workmen engaged, for example, in glass works and in stone-cutting, 80 per cent. of those on the sick lists suffered from consumption. Figures relating to the organic dusts, on the other hand, show that they are much less to be feared. Protective measures against workshop dusts may, of course, vary in character, depending upon the nature of the dust against which protection is to be afforded. A good general ventilation of the workrooms, however, is always to be recommended, the proportion of impurities in the air being in this way reduced to an appreciable extent. Special appliances designed to remove the dust immediately from the places where it is produced will, however, continue to claim attention, and improved methods will always meet with a favorable reception. Water has been and is used in many instances to prevent the formation of dust, and in grinding and pulverizing has given very successful results. Masks and respirators also have been used, but their application has been comparatively limited and is not to be recommended in all cases. They are generally heavy and uncomfortable, heat the air which is inhaled, and render breathing difficult.

Trouble at the Edgar Thomson Works

The strike of about 100 workmen at the Edgar Thomson Furnaces, at Pittsburgh, has resulted in the stoppage of the entire

their endeavors to secure a much greater increase than the one they themselves have agreed to. The furnace workmen were offered 10 per cent. advance over last year, with the same hours of labor. They are striking for eight-hour instead of twelve-hour turns and the same wages that were paid in 1884. The management positively refuse to pay this, claiming that it is impossible for them to make metal in competition with outside furnaces, and that the rates they have offered are always 20 per cent., and in some cases more, in excess of those paid at furnaces but a short distance from them. It is thought the difficulty will be satisfactorily settled during the week.

WASHINGTON NEWS.

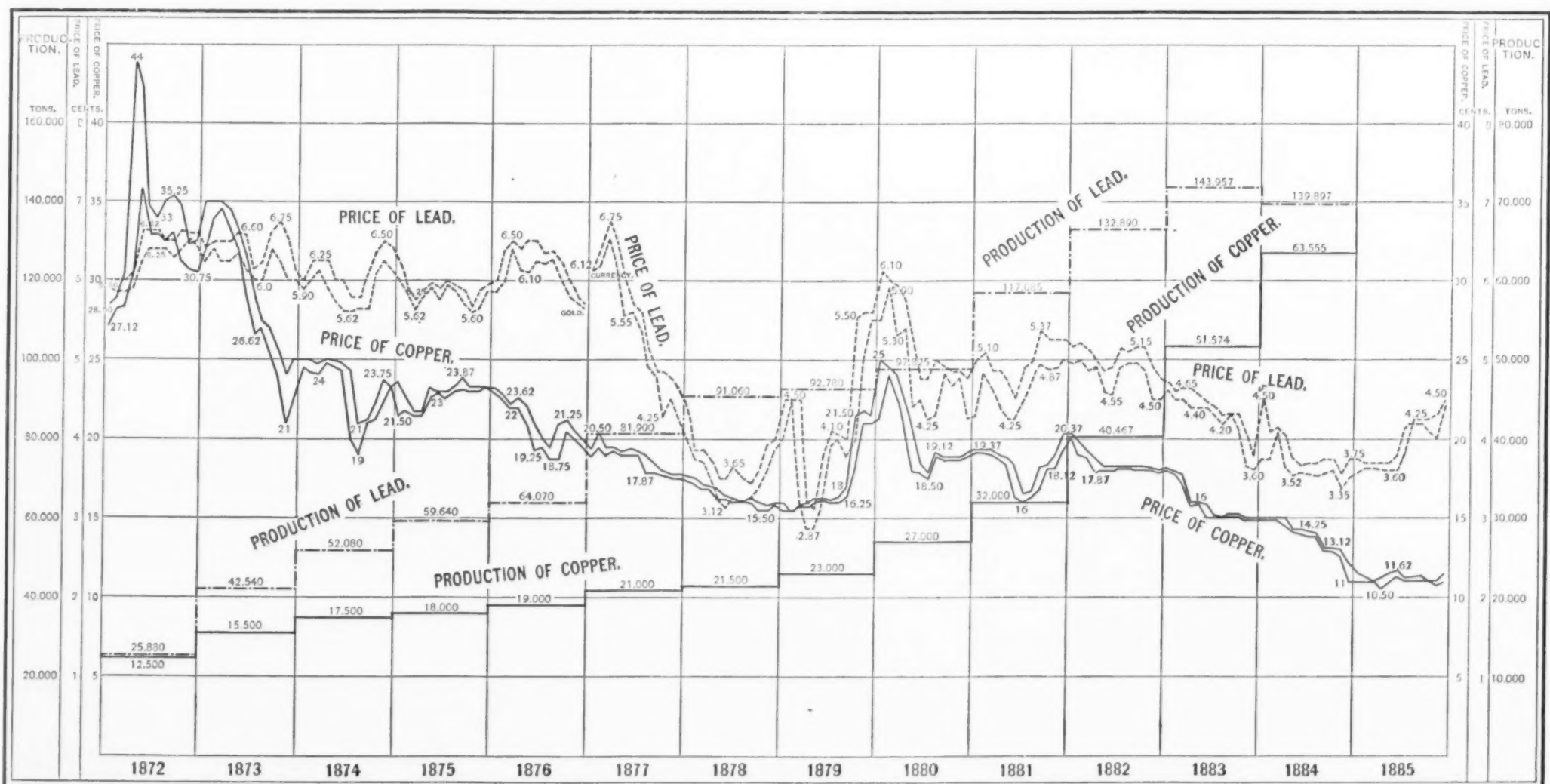
(From Our Regular Correspondent.)

WASHINGTON, D. C., January 20, 1886.

The Committee on Ways and Means have organized for business, and are now waiting for the printing of a mass of bills which have been referred to them, affecting favorably or unfavorably the economic interests of the country.

THE RESOLUTION AGAINST REOPENING THE TARIFF.

The Committee on Finance of the Senate have not yet taken up the resolution submitted before the recess against a reopening of the tariff question. Senator Cameron, referring to the subject, says: "In my opinion the best solution of the tariff question at this time would be an emphatic and prompt stand by the Senate. This would be a guarantee to business industries of the country, which are reviving, that they may expect immunity from tariff agitation during the period of this Congress, and doubtless until the session of the Fiftieth Congress, commencing



PRODUCTION AND PRICES OF COPPER AND LEAD.

policy still remains valid. In some other States, as in Massachusetts, the rule is exactly opposite.

A reasonable precaution on the part of all those who propose to transfer insured property or to receive it in any of the ways above described, if they desire to retain the protection of the policy, is to obtain the consent of the insurance company. In some cases it might be necessary or desirable to take out a new policy. Ignorance of the law on this subject, or want of proper care and prudence, has frequently led to serious loss.

The Connellsville Coke Trade.

The beginning of 1886 finds the condition of the Connellsville region very much improved over that of a year and two years ago. The increase in demand for coke, growing out of the improvement in the Bessemer steel-rail trade and the consequently increased demand for pig iron, has led to a gradual increase in the number of ovens in operation, until at the present time practically all of the ovens in that region are in blast, the percentage out being only about equal to the number that is usually idle for repairs or other reasons. Of the 10,832 ovens in the coke region but 975 were idle before the present strike. Of these 731 belonged to the pool, 27 were ovens connected with furnaces which do not make any coke for the general market, 40 were in what is known as the Pleasant Unity district, and 177 are old ovens practically useless. It is true that, owing to the banking-up of the Edgar Thomson furnaces and those of other steel companies consuming about 200 cars a day, the production was temporarily somewhat decreased, the ovens having what is called a "Hungarian Sunday"—that is, an off day during the week. This

coming into prominence as producers. The mines of the Rochester and Pittsburgh Coal and Iron Co., on the Rochester and Pittsburgh road, are increasing rapidly, and, though the region is at present but a small one, it is having considerable influence in the Buffalo and other New York markets. The coke from this section has found its way into the Chicago market; it has acquired considerable reputation, and competes with the Connellsville coke. The same is true of the New River coke in Western markets, such as Cincinnati, St. Louis and Chicago, but the output of these sections is so small, compared with the output of the Connellsville region, that the latter will probably for many years continue to hold its commanding position.

There has been considerable discussion in the Pittsburgh papers recently as to the cost of making coke. The following is an estimate published in one of the daily papers of that city by a miner, and represents the daily expenses of a bank of 40 ovens, 20 being drawn each day:

Cost of coal (1/4 cent per bushel).....	\$12.35
70 cars of coal at 27 cents.....	18.90
Charging ovens.....	2.00
Leveling.....	1.00
Drawing 20 ovens.....	11.00
Hauling and feeding stock.....	2.75
Boss' wages.....	2.00
Oil, posts, rails, &c.....	1.50
Interest on capital.....	2.50
Syndicate's commission for handling coke.....	3.65
Total.....	\$58.15
25 8-10 tons of coke at \$1.20.....	\$70.56
Less daily expenses.....	58.15
Balance.....	\$12.41

This makes the cost of putting a ton of coke in the cars ready for shipment 93 1/2 cents.

An estimate of the cost by a manufacturer is as follows:

production of lead reached its highest point in 1883. It declined a little in 1884, and will show a further falling off in 1885. Copper will probably show an increase again in 1885, rough estimates placing the total output for that year at 150,000,000 pounds. The unit for copper in the diagram is the gross ton; for lead it is the short ton.

Dust in the Workshop.

Since the necessity of protecting workmen against the dust produced in different manufacturing processes was first suggested a good deal of attention has been given to the matter, and important advances have been made in the line of dust preventing and removing devices. Much useful information has also been gathered concerning the injurious character of various kinds of dust, and altogether the different points of the subject have in some places been well considered. From what has thus far been contributed to the matter it appears that among the prevailing kinds of mineral and organic dusts the former are given the first place as regards deleterious properties. Metallic dusts and those produced from different kinds of flint, such as those due to the working of stone, slate, sandstone, emery, glass and iron, copper, zinc, &c., all exert a most injurious influence on the respiratory organs. Dust from brass and lead occasionally produces poisonous effects, while that resulting from arsenic, lead salts, and also from certain salts of copper and zinc, has this property in a marked degree. Dust from chromium and lime salts produces violent irritation. Organic dusts are in general less dangerous, though liable to transmit disease. The more common varieties found in the air of workshops are dust from charcoal and anthracite coal, soot, sawdust, straw, hemp, flax, cotton and plant fibers, &c. Animal dust may be traced to human and animal hair, bristles, silk, leather, feathers, horn and other substances.

As to the injurious properties of the different dusts, Dr. L. Hirt, of Breslau, Germany, has furnished interesting tables in a

works, the blast furnaces being all banked and the mills idle. As we have already announced, an agreement was reached between the rolling mill employees and the management as to the rates of wages for the year 1886, but 10 per cent. advance being conceded, and the mills had resumed work after a practical agreement on the part of the proprietors to furnish steady work during the year. The difficulty at the blast furnace promised to interfere somewhat with this, but arrangements were being made to melt pig in the cupolas instead of running direct from the blast furnace, as is the usual practice. Attempts were also made to put the blast furnace in operation with new employees, and they had succeeded in getting one furnace started, when upon delivering the molten metal from the furnace at the converter-house the men positively refused to work the metal. The furnace was at once shut down and the mills stopped, the management assuming that the action of the men in declining to work the metal relieved them from the obligation to furnish steady work.

Carnegie Bros. & Co. are probably not at all distressed at this turn of affairs. Under the agreement for restriction of production that has been reached it would have been necessary for them to have stopped a portion of the time during the present year to have kept within the tonnage assigned to them, and though it is no doubt true that the bond that holds the steel-rail manufacturers together is by no means a strong one, and may break before the year ends, especially if the demand for rails reaches the figures that are confidently assumed by some parties, still at the present time the agreement is being fairly well lived up to. A stoppage then, if the agreement continues in force, would have been necessary, and the opportunity now offered by the refusal of the men to work the metal from the furnace is not an unwelcome one.

A remarkable instance of generosity is furnished by the millmen in connection with this matter. They are voluntarily subjecting themselves to great loss and inconvenience to help the blast-furnace men in

ing December, 1887. After that, of course, will depend upon the political complexion of that body. I hardly think that the protection people will lose control of the Senate, and they might with organization and skillful work carry the next House of Representatives, but through the usual apathy and indifference of manufacturers and others interested in maintaining our industrial system, and by waiting until the last minute, we might lose both Houses. There should be some defined and immediate action by the Senate now. The people should take the matter up and by such a decisive and overwhelming rout of any candidates or political parties favoring free trade legislation put the stamp of condemnation upon such un-American doctrines." The Republican Members of the Finance Committee, while favoring protection, are divided on the resolution, some claiming that the national platform commits them to some sort of revision. Voorhees and McPherson regard the resolution as least likely to force them to an issue with their colleagues on the committee and the majority of their party, while Beck, Harris and Vance believe in letting the pro-British movement go on.

A RECOGNITION.

The Committee on Legislation of the Eastern Pig-Iron Association, who visited this city a few days ago in order to take a survey of the ground, returned convinced upon uncontrovertible authority that the conservative wing of the majority in the House on the tariff are not prepared to go to the length that they did in opposing the Morrison bill a few years ago. They are now inquiring how much reduction American industry can stand in order to make a compromise with the pro-British managers on a present reduction, with a view to another slice in the next Congress. The figures at which they put duties are \$5 a ton duty on pig iron, instead of \$6.72, and 50 cents a ton on iron ore, instead of 75 cents, and everything else in proportion. It is now evident that the only safety of American industry is local organization for tariff defense, as suggested in *The Iron Age* a few weeks ago.

THE "NEW EASY" LAWN MOWER,

MANUFACTURED BY

Blair Manufacturing Co., Springfield, Mass., U. S. A.



SPECIAL ADVANTAGE, No. 1.

The "NEW EASY" is the *only* Lawn Mower that will cut to within *one inch* of walls, fences, shrubbery, around trees, &c. (See above cut.)

To the Hardware:
AND
Agricult' Implement
Trade.

Special Notice.

Do you want to handle the Lightest Running, Easiest Cutting, BEST SELLING Lawn Mower in the market? If you do, examine carefully the merits of the "NEW EASY," and you will know what Mower to buy. No Lawn Mower has yet been made that approaches so near to the ideal Machine for every kind and variety of work as the "NEW EASY." It stands pre-eminent and alone as the only perfect Mower manufactured, and combines the characteristic and exclusive advantages of the front-cut, traction-roller style of machine—viz., adaptability to every grade of lawn work, with extreme ease of operation.



SPECIAL ADVANTAGE, No. 2.

The "NEW EASY" is the *only* Lawn Mower that will run off its level and cut low terraces, mounds, flower beds, &c. (See above cut.)



SPECIAL ADVANTAGE, No. 3.

The "NEW EASY" is the *only* Lawn Mower with sufficient traction to cut high terraces with rope attachment. (See above cut.)

Herewith are illustrated a few of the special uses to which the "NEW EASY" is adapted, and that are not possessed or claimed for any other Mower, while for general purpose work it is *Chief of the best*.



Notice the "New Easy" Lawn Mower and What We Claim for It.

We do not advertise the "New Easy" as a Field Mower, nor assert that it will cut grass 12 inches high with perfect ease; but for a Lawn Mower, Strong, Durable, Easily Sharpened and Adjusted, of Varied Capacity, Graceful Form, Long and Pleasing Service, and so easily operated that a lady or child may use it without fatigue, we do claim the "NEW EASY" to be without a rival; and our Agents are authorized to sell this Mower with the express guarantee that these claims shall be verified by trial.



SPECIAL ADVANTAGE, No. 4.

The "NEW EASY" is the *only* Lawn Mower that will cut narrow borders. (See above cut.)



The "Bay State" Lawn Mower.

The Lightest and Quietest Running, Best Constructed, Handsomest and Most Durable Rear-Cut, Side-Wheel Mower Made!

Guaranteed first class in every respect, and superior to any other machine of this style in the market.

Four Sizes. 12 in., 14 in., 16 in., 18 in.

Every Mower unconditionally warranted. Made in Seven Sizes. 10 in. to 24 in. All for hand use.

Catalogues and Price Lists of our Lawn Mowers, with discounts to the Trade, furnished on application to any of the following

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Lewis & Scott, Denver, Col.
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John Agnew, Columbia, S. C.
Gilmour & Co., Montreal, Canada.
Markt & Co., New York, London and Hamburg, for Great Britain and the Continent of Europe.
Henry W. Peabody & Co., Boston and New York, for Australia and New Zealand.



THE "Victor" Lawn Mower

Is designed to meet the growing demand for a good, durable Mower at a low price. The "Victor" is a center-cut machine, provided with extra large driving wheels, and a noiseless and durable ratchet. The knives are made of the best quality cast steel, and the whole Mower is constructed in a strong, substantial manner, and is offered to the Trade as the best Mower for the price the market affords.

Three Sizes. 12 in., 14 in., 16 in.

We also Manufacture the "BAY STATE" and "VICTOR" Lawn Mowers, herewith illustrated and described.

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Bridgeport Brass Co., Bridgeport, Conn. 2
David John & Sons, 100 John, N. Y. 2
Holmes, Booth & Hayden, 25 Park Place, N. Y. 2
Plume & Atwood, Mfg. Co., 18 Murray St., N. Y. 2
Navy Mfg. Co., 421 Broome, N. Y. 2
Waterbury Brass Co., 265 B'way, N. Y. 2
Brass Butt Hinges.
Hobart W. & J., 16 to 18 Chambers, N. Y. 20
Brass Foundries.
McFarland Wm., Trenton, N. J. 4
Reeves Paul S., Philadelphia. 48
Brass Goods.
Waterbury Mfg. Co., Waterbury, Conn. 2
Bridge Building.
Moseley Iron Bridge & Roof Co., 5 Dey, N. Y. 44
Union Bridge Co., 15 Broadway, N. Y. 44
Brushes.
Brouwell Brush and Wire Goods Co., Cincinnati. 32
Builders' Hardware.
S. S. Spencer's Sons, Guilford, Conn. 39
Flag Stanley G. & Co., Philadelphia. 48
Whipple Mfg. Co., Cleveland, O. 13
Butcher and Shoe Knives, Manufacturers of.
Wilson John, Sheffield, England. 40
Butts and Hinges.
Chicago Spring Butt Co., Chicago, Ill. 45
Satin Machine Co., Montpelier, Vt. 47
Smith & Egge Mfg. Co., Covington, La. 32
Stanley Works, New Britain, Conn. 43
Union Mfg. Co., 103 Chambers, N. Y. 7
Calipers.
Richardson C. F., Athol, Mass. 3
Can Makers' Tools and Machines.
Sagana Stamping and Tool Co., Buffalo, N. Y. 37
Can Openers.
New England Specialty Co., North Easton, Mass. 39
The Fred J. Meyers Mfg. Co., Covington, La. 32
Car Axles.
Roberts A. & P. Co., 265 S. 4th, Phila. 5
Car Wheels.
Knoxville Car Wheel Co., Knoxville, Tenn. 36
Union Foundry & Pullman Car Wheel Works, Chicago, Ill. 36
Whitney A. & Sons, Philadelphia. 45
Carriage Bolts, Makers of.
Norwich Bolt Works, Norwich, Conn. 12
Carriage Hardware, Makers of.
E. D. Clapp Mfg. Co., Auburn, N. Y. 10
Smith H. D. & Co., Plantville, Conn. 12
Woodman W. B. & Co., Newark, N. J. 32
Woodruff, Miller & Co., Mount Carmel, Ct. 15
Castings, Iron.
S. Cheney & Son, Manlius, N. Y. 30
Levin Thos. & Co., Philadelphia, Pa. 7
Haight & Clark, Albany, N. Y. 10
Hammer & Co., Branford, Conn. 14
North Brothers, Philadelphia, Pa. 45
Syracuse Mail Iron Works, Syracuse, N. Y. 4
Wetherill Robt. & Co., Chester, Pa. 47
Castings, Iron and Brass.
S. S. Spencer's Sons, Guilford, Conn. 39
Castings, Steel.
Eureka Cast Steel Co., Chester, Pa. 48
Flag Stanley G. & Co., Philadelphia. 48
Johnson I. G. & Co., Spuyten Duff, N. Y. 48
Pittsburgh Steel Casting Co., Pittsburgh. 48
Standard Steel Casting Co., Thurlow, Pa. 6

Clue.
Russia Cement Co., Gloucester, Mass. 39
Governors, Engine.
Tabor Mfg. Co., 118 Liberty, N. Y. 45
Grinders, Emery.
The K. A. Mfg. Co., Chillicothe, Ohio. 3
Grindstones.
Berea & Huron Stone Co., Cleveland, O. 39
Childs J. M. & Co., Utica, N. Y. 15
Wood Walter M., 283 and 285 Front, N. Y. 30
Gunpowder, Makers of.
Lafin & Rand Powder Co., 29 Murray, N. Y. 7
Hammers.
Buffalo Hammer Co., Buffalo, N. Y. 44
Hammer, Steam.
Beaury & Cunningham, Boston, Mass. 48
Bradley & Co., Syracuse, N. Y. 48
Hand Force Pumps.
Union Mfg. Co., 103 Chambers, N. Y. 7
Hardware Comm'n Merchants.
Field & Trullar, Buffalo, N. Y. 10
Graham J. H. & Co., 113 Chambers, N. Y. 8
Haines Samuel A., 88 Chambers, N. Y. 12
Hardware Importers.
Field Alfred & Co., 93 Chambers, N. Y. 10
Hardware Manufacturers.
Enterprise Mfg. Co., Philadelphia, Pa. 42
Humason & Beckley Mfg. Co., New Britain, Conn. 30
Stanley Works, New Britain, Conn. 43
Union Mfg. Co., 103 Chambers, N. Y. 7
Hardware Mfrs' Agents.
Holmes & Coffin, 140 Chambers, N. Y. 14
Hardware Shelf Boxes.
Green S. H. & Murray, N. Y. 5
Jones Jesse & Co., Phila. Pa. 10
Hardware Specialties.
Acme Shear Co., Bridgeport, Conn. 10
Chalmers-Spence Co., 419 Chambers, N. Y. 10
Brown R. H. & Co., New Haven, Conn. 46
Howe Bros. & Hulbert, West Winsted, Conn. 10
Manhattan Bldg. Co., Reading, Pa. 44
Rex A. C. & Co., Philadelphia, Pa. 36
Scranton Mfg. Co., Chicago, Ill. 44
Underhill, Clifton & Co., 91 Chambers, N. Y. 10
Woodman W. B. & Co., Newark, N. J. 32
Hardware, Theatrical.
Marlin Samuel, 137 Eighth av., N. Y. 30
Harness Snaps.
Covert Mfg. Co., West Troy, N. Y. 41
The Meneley Hardware Co., West Troy. 32
Hay Knives.
Clawson H. W., 82 Chambers, N. Y. 10
North Wayne Tool Co., Hallowell, Me. 45
Hinges.
Mann Jas. & Sons, Buffalo, N. Y. 40
Stanley Works, New Britain, Conn. 43
Union Mfg. Co., 103 Chambers, N. Y. 7
Hoes.
Canton Hoe and Tool Co., Canton, Ohio. 6
Hoe Ringers.
Chalmers-Spence Co., 419 Chambers, N. Y. 10
Hoisting Machines.
S. Alfred & Co., 314 Green, Phila. 45
Harrington & Co., Son & Co., Philadelphia. 47
Cox & Sons, 100 Chambers, N. Y. 2
Morse, Williams & Co., Philadelphia. 47
Sellers Wm. & Co., Philadelphia. 47
Moore Mfg. Co., Chicago, Ill. 3
Scranton Mfg. Co., Chicago, Ill. 44
Syracuse Bolt Co., Syracuse, N. Y. 44
Victor Mfg. Co., Newburyport, Mass. 9
Horse Raps and Files.
Heller & Bro., Newark, N. J. 8
Horse Shoe Makers of.
Rhode Island Horse Shoe Co., Providence. 12
The Burden Iron Co., Troy, N. Y. 4
Hot-Blast Stoves.
Hetherow James P., Pittsburgh, Pa. 4
Household Articles.
Tucker & Dorsey Mfg. Co., Indianapolis. 36
Hydrants, &c.
McLean John, 290 & 298 Monroe, N. Y. 12
Hydraulic Jacks.
Borden & Co., 79 Cortlandt, N. Y. 12
Watson & Stillman, 4708 Grand, N. Y. 47
Ice-Cream Freezers.
White Mountain Freezer Co., Nashua. 38
Insurance, Boiler.
Hartford Steam Boiler Inspection & Insurance Co. 38
Iron, Manufacturers' Agents.
Cox Justice, Jr. & Co., 333 Walnut, Phila. 5
Hoffman & Co., Philadelphia, Pa. 47
Hoffman J. W. & Co., 308 S. Fourth, Phila. 5
Levy Henry & Co., Philadelphia, Pa. 5
Seelye, Church & Co., San Francisco, Cal. 20
Iron, Manufacturers of.
Ansonia Brass & Copper Co., 19 Cliff, N. Y. 2
Burden Iron Co., Troy, N. Y. 4
Kirkpatrick & Co., Pittsburgh, Pa. 4
Leonard John, 100 Chambers, N. Y. 2
Montour Iron & Steel Co., Danville, Pa. 40
Phoenix Iron Co., 410 Walnut, Phila. 5
Plymouth Iron Works, Wheeling, W. Va. 45
Riverside Iron Works, Wheeling, W. Va. 45
The Pacific Rolling Mill Co., Bridgeport, Conn. 30
The Wilmot & Hobbs Mfg. Co., Bridgeport, Conn. 30
Troy Steel Works, Troy, N. Y. 4
Tyronne Iron Co., Tyronne, Pa. 6
Whitney A. R. & Co., 58 Hudson, N. Y. 4
Iron and Steel, Swedish.
Lindner & Co., Stockholm, Swed. 41
Iron Brokers.
Etting Edward J., Philadelphia, Pa. 5
Fox John, Bridgeport, N. Y. 4
Walbaum W. & Co., Philadelphia, Pa. 5
Watts Ethelbert & Co., Philadelphia, Pa. 5
Iron Commission Merchants.
Haines Samuel A., 88 Chambers, N. Y. 12
Harris Wm. R. & Co., 103 Chambers, N. Y. 7
John L. Hogan, Philadelphia, Pa. 5
Lehr J. Tattal & Co., Philadelphia. 5
Lundberg & Co., 208 S. Fourth, Phila. 5
Mohr J. J., 430 Walnut, Philadelphia. 5
Wister L. & R. Co., Philadelphia, Pa. 5
Iron Dealers.
Abbott & Co., 190 South, N. Y. 4
Abbott & Co., N. Y. and Boston. 41
Bonnell, Botsford & Co., Youngstown. 4
Bordwell & Co., N. Y. 4
Cox Justice, Jr. & Co., 333 Walnut, Phila. 5
Cox Justice, Jr. & Co., Philadelphia. 5
Hart Wm. R. & Co., Philadelphia. 5
Himrod Chas. B., Chicago, Ill. 4
Judson B. F., 407 and 409 Water, Phila. 5
Keely Jerome & Co., Philadelphia, Pa. 5
Lundberg & Co., 208 S. Fourth, Phila. 5
Ogden & Wallace, 85 to 91 Elm, N. Y. 4
Pierston & Co., 24 to 27 West, N. Y. 4
Wallace Wm. & Co., 58 Hudson, N. Y. 4
Wilson E. H. & Co., Philadelphia, Pa. 5
Iron Foundries.
Barnan, Fraps & Pottsville, Pa. 4
Hoson & Chapin Mfg. Co., New London, Conn. 14
Iron Pig.
Abbott & Co. (Swedish), New York & Boston. 41
Pace, Newell & Co., Boston, Mass. 4
Williamson James Co., 63 Wall, N. Y. 41
Iron Planers.
Brettel Geo. E., Rochester, N. Y. 45
Iron Sheet, Manufacturers of.
Everson, Hammond & Orr, Pittsburgh. 4
Jersey City Galvanizing Co., Jersey City. 4
Lefferts, Marshall & Co., 90 Beckman, N. Y. 4
Wood W. D. & Co., Limited, Pittsburgh. 4
Iron Sifters and Nails.
Morris, Wheeler & Co., 14 Cliff, N. Y. 5
Iron, Ornamental.
Champion Iron Fence Co., Kenton, O. 41
Key Blanks.
Eagle Lock Co., 95 Chambers, N. Y. 42
Knife Sharpeners.
Parkin W. H., Cleveland, Ohio. 36
Lacquer.
R. S. Allen & Co., 112 John, N. Y. 3
Lamp Stoves.
Florence Machine Co., Florence, Mass. 3
Lathes.
Harrington & Co., Son & Co., Philadelphia. 47
Lawn Mowers.
Blair Mfg. Co., Springfield, Mass. 18
Eadsboro & Coldwell Mfg. Co., Newburg, N. Y. 12
Haines S. A. & Co., 88 Chambers, N. Y. 12
Lloyd & Supple, 50 W. 4th, Phila. 32
Mast, Fox & Co., Springfield, O. 15
Lead Pipe Cutters.
R. T. Smith & Co., Brockton, Mass. 4
Lead Solder.
Ripley Mfg. Co., Unionville, Conn. 37
Levels.
Richardson C. F., Athol, Mass. 3
Locks and Keys, Manufacturers of.
Harris & McCall, New York. 26
Eagle Lock Co., 95 Chambers, N. Y. 42
Manhattan Bldg. Co., Reading, Pa. 44

J. E. Quackenbush & Sons, 535 Eighth av., N. Y. 38
Ireland Mfg. Co., Cincinnati, O. 37
Smith & Egge Mfg. Co., Bridgeport, Conn. 9
Stoddard Lock Co., 104 Rende, N. Y. 39
The Charles Parker Co., Meriden, Conn. 13
Whipple Mfg. Co., Cleveland, O. 13
Machinery.
John & Son, New Haven, Conn. 45
Barnes W. F. & Co., Rochester, Ill. 45
Brettel Geo. E., Rochester, N. Y. 45
Dickson M. M., Scranton and Wilkes-barre, Pa. 45
Garvin E. & Co., 130 Centre, N. Y. 46
Harrington & Co., Son & Co., Philadelphia. 47
Hoson & Chapin Mfg. Co., New London, Conn. 14
Parker & Sons, Philadelphia, and 79 Liberty, N. Y. 47
Sawtooth Foundry and Machine Co., Philadelphia, Pa. 47
Stokes & Parrish Machine Co., Philadelphia, Pa. 47
Stow Flexible Shaft Co., Phila. 47
The Stiles & Parker Press Co., Middlebury, Conn. 48
Union Foundry & Pullman Car Wheel Works, Chicago, Ill. 36
Waterbury Farrel Foundry and Machine Works, Waterbury, Conn. 48
Wetherill Robert & Co., Chester, Pa. 47
Machinery's Tools and Supplies.
Atlanta Rubber Co., Atlanta, Ga. 47
Bells Machine Co., Wilmington, Del. 45
Blaisdell P. & Co., Worcester, Mass. 45
Brettel Geo. E., Rochester, N. Y. 45
Sellers Wm. & Co., Philadelphia. 45
Liberty, N. Y. 47
Starrett, L. S., Athol, Mass. 11
Tanner Bros. & Co., Greenfield, Mass. 39
Mallets.
N. Y. Handle & Mallet Works, 450 E. Houston. 13
Pond & Sons, Lockport, N. Y. 34
Measuring Pumps.
Lane Bros., Poughkeepsie, N. Y. 12
Measuring Rules.
Stephens & Co., Riverton, Conn. 40
Measuring Tapes.
Eagle Lock Co., 95 Chambers, N. Y. 42
Metal Polish.
Walker F. A. & Co., Boston, Mass. 32
Metal Shingles.
Van N. & Co., Boston, Mass. 41
Metals.
Dickerson, Van Dusen &

The total amount of Anthracite Coal sent to market for the week ending January 9, as reported by the several carrying companies, was 455,757 tons, compared with 523,805 tons in the corresponding week last year, a decrease of 68,048 tons. The total for December was 2,496,825 tons: increase compared with December, 1884, 327,386 tons. The official total for the year is 31,623,529 tons: increase compared with 1884, 866,534 tons. The stock of Coal on hand at tidewater shipping points December 31, 1885, was 754,545 tons. The amount on hand December 31, 1884, was 874,681 tons. Of the total production in 1885 16,236,470 tons, or 51.34 %, were from the Wyoming region; 5,898,034 tons, or 18.65 %, from the Lehigh region, and 9,428,226 tons, or 30.01 %, from the Schuylkill region.

New York Iron Market.

The 1st of January, when official reports to the Board of Control put the sales for 1886 delivery at 670,600 tons, there have been sales which carry the aggregate beyond 725,000 or fully one-half of the capacity of the mills. With a probable new mileage of at least 6000 miles and the large amount of renewals indicated by sales already made, it may be regarded as certain that the mills will be so well occupied that no marked reaction is probable during the year. The market can now take care of itself without any help whatever from the existence of the combination. The latter has accomplished its object, but it is misleading to assert that the Rail mills have

Toe Calk Steel.	
inches and wider x $\frac{3}{4}$ to 1 inch thick	2.4¢
inches and wider x $\frac{1}{4}$ to 5-16 inch thick	2.5¢
inches and wider x 3-16 and 7-32 inch thick	2.6¢
inches and wider x $\frac{1}{16}$ and 5-32 inch thick	2.7¢

Box grade.

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Metal Exchange

Foreign Iron—The market shows a little more animation, and buyers could be

Hardware.—Orders from the dealers kept up well to the close of the year, but on account of recent storms and severe weather manufacturers and jobbers have not sent out their men as early in the year as usual. Business is therefore not so brisk as it otherwise most probably would be, though

els, 8½¢; Crucible Machinery, 4½¢ @
4¢; Bessemer and Open-Hearth do., 4½¢
4¾¢. Steel Nail Slabs, \$32 ½ ton; do.
rooms and Billets, \$33 @ \$35.

Old Rails.—Old Iron Rails continue scarce, and prices are still tending upward. We now quote at \$24.50 @ \$25, with sales reported at \$24.50 @ \$24.75. The sale reported at Albany, N. Y., to come here, would cost the buyer at least \$25, delivered in Pittsburgh. Old Steel Rails continue scarce, and, while we have heard of no sales above \$22 for Mixed and \$23 for Long Lengths, it is probable that they would bring more.

Railway Track Supplies.—Prices are quoted steady at 2 1/2¢, 30 days, for Spikes; 1.70¢ @ 1.75¢ for Splice Bars, and 2.80¢ @ 3¢ for Track Bolts.

Steel Rails.—The market is reported less active, but prices remain unchanged at \$35 @ \$35.50, cash, at mill.

Old Material.—Dealers report trade less active, but prices remain unchanged. No. 1 Wrought, \$18 @ \$19, net ton; Wrought Turnings, \$14; Old Iron Car Axles, \$24; Cast Borings, \$12, gross ton; Old Car Wheels, \$17, gross. The latter are worth about as much West as can be obtained in this market.

Chicago.

Office of The Iron Age, 36 and 38 Clark St.,
Cor. Lake St., Chicago, January 18, 1886.

Hardware.—Business in the jobbing trade is quiet, though somewhat better than last week. Very few retailers have as yet made purchases of any importance except in Nails and Barb Wire. Jobbers as a rule have sent out their traveling men, and rivalry for trade is already visible. Manufacturers have been rearranging prices and discounts, and the advances which have been and are being announced have led to the general impression that the market would be firm, but from present appearances it is doubtful whether this will be the case. The probability that some very low prices will be made by jobbers is becoming more evident as the season approaches and trade progresses. This condition of affairs will perhaps not reach the manufacturer, but be confined entirely to those engaged in the jobbing trade, the cause for which may be found in rivalries that have been instigated in times past, but allowed to smolder until they have become aggressive by further intrusions.

Barb Wire.—The demand is gradually increasing, and the prospect of a more than usually good trade very encouraging. Jobbers' quotations remain at 4¢ for Painted Wire and 5¢ for Galvanized, with the exception that 1/2¢ additional is asked on Thick-set Wire. In carload lots the usual rebate is allowed. At the adjourned meeting of the licensed manufacturers, held on the 14th inst., a permanent organization was formed under the name of the Barb Wire Manufacturers' Association, and the following officers were elected: President, A. N. Klinefelter, of Joliet; secretary and treasurer, O. O. Collins, of Chicago. The headquarters of the association will be at No. 54 Dearborn street until permanent quarters can be secured. The Committee on Price reported "that, notwithstanding the fact that Plain Wire has advanced \$2.20 per ton since the present price list was adopted, and that there is every prospect for a still further advance, they do not consider it advisable at this meeting to make any change except in price of Thick-set Wire. We would therefore advise that the price for Thick-set Wire be advanced 1/2¢ per lb over the price for Cattle Wire, and that, with this exception, the present price list be affirmed, and, as a further advance in Plain Wire is anticipated, we would recommend that a meeting of the manufacturers be held January 29 with a view of making such advance in price of Barb Wire as the present and prospective prices of Plain Wire may require." The following is the scale of prices adopted: For Painted Wire, Two and Four Point, regular, in 50-ton lots, 4¢ per lb; in less quantities, 4 1/2¢ per lb; Thick set Wire, 1/2¢ above regular; Galvanized Wire, 1¢ advance over price of Painted.

Nails.—While it is freely stated by large buyers that manufacturers have materially stiffened on the price of Iron Nails during the last three weeks, it is none the less certain that they have weakened in this market. Jobbers are nominally asking \$2.50 in small lots and \$2.40 in carload lots, but there is no unanimity in these figures, as they are sold out of store by the retail trade in single kegs at the latter figure. If, however, a buyer of a large lot came forward it is hardly possible that he could get them for less. Makers decline to quote for delivery beyond January, and have recently advanced their price 10¢ per keg at Eastern mills. Stocks of Western mills are taken up so rapidly in small lots that they are not in the market for future delivery at all. For late February and March delivery Eastern mills are asking \$2.50 at mill. Steel Nails are in short supply, and quoted at \$2.65 in small lots. It is said that orders for carload lots would not be accepted by jobbers at these figures—perhaps more for want of stock than on account of price.

American Pig Iron.—Prices on all grades have been steady and firm. The demand from consumers for early delivery was fully up to the average of any week within the last 60 days, in lots ranging from 50 to several hundred tons. There appears to be less anxiety on the part of buyers to secure iron that is not an immediate necessity, since prices have advanced to a point where speculation is less likely to exert an influence on its cost. Several large blocks

of Charcoal and Coke Irons, aggregating 8000 to 10,000 tons, have changed hands recently without disturbing prices in the least. These sales were made at figures which confirmed prices named on smaller quantities. Furnacemen are not seeking to dispose of their iron in large lots, and when buyers come into the market they are compelled to get nearer to prices asked than was necessary during the last two years. Small lots of standard brands Lake Superior Charcoal Iron were sold at \$23, immediate delivery. Fancy brands in similar lots command \$24. For deliveries extending over three to six months there is a disposition to advance the price \$1 @ \$2 per ton, according to brand. Notwithstanding that this condition of the market is general on Charcoal Irons, there are exceptional brands that can be had at a shade under prices named for present or future delivery. Prices on Coke Irons. All Lake Ore, have evened up somewhat, and all good qualities are now quoted at \$20. Cinder Mixed Irons range from \$18 to \$19. The best makes of Ohio Standard Black bands are quoted at \$22, though some Irons of this class can be had at \$21. Hanging Rock Irons are held at \$20.50 for No. 1. In Southern Irons very few sales have been made recently, as business was temporarily suspended, awaiting the action of the railroads regarding freights. The market, however, continues steady at the nominal quotation of \$19.50 for No. 1, \$18.50 for No. 2, \$17.50 for No. 2 1/2. No. 1 Mill is quoted at \$17.25, and No. 2 at \$16.75. Sales agents report that they have no iron to sell at less than these figures, but it is rumored that sales of small lots have been made at a fraction below prices named.

Merchant Steel.—The conditions are said by jobbers to be improving, but the change is so slow and gradual that it is almost imperceptible to those not engaged in the trade. The classification of steel by the manufacturers is being felt in a small degree and is a start in the right direction. Jobbers claim that, while prices have not advanced materially, it so arranges the shapes and sizes that they will be able to hold the market more regular and come to a better understanding among themselves. The demand has considerably improved since the first of the year, and buyers apparently have more confidence in prices named and are placing specifications more liberally. From store we quote Open-Hearth and Bessemer Spring Steel at 23 1/2¢, and from mill, jobbing rates, 2.6¢; Flat Machinery, 2 1/2¢; Crucible Machinery, 5¢; Crucible Cast Plow Steel, 4 1/2¢; Patented Plow Steel, 5 1/2¢; Standard Tool Steel, 8¢; High Grades, 9 3/4¢ @ 13 1/2¢, with Specials ranging to 20¢.

Steel Rails.—There is virtually nothing new to report. A few small lots have been called for during the week, but large buyers are making no move at the present time. Mills continue to make a nominal quotation of \$38 @ \$40.

Plate and Tank Iron.—The market has been fairly active. Quite a number of inquiries were made for large and small lots. We make the following quotations from store: Tank Steel, 3¢; Flange do., 4¢; do. Fire-Bx do., 4 1/2¢; Tank Iron, 2.60¢; Shell do., 3¢; Flange do., 4¢; Angles, 2 1/2¢; Heavy Sheet Irons, Nos. 10 to 14, 2.60¢; No. 16, 2.80¢; No. 18, 2.90¢.

Bar Iron.—The demand is reported very good by some dealers, while others say that the trade is only in fair proportion for the season. Jobbers' rates continue to be 1.80¢ from store, and it is claimed that this price is now being obtained for all classes of iron. These figures must be accepted with considerable liberality, as it is hardly possible that consumers will pay the same rates for Old Rail Iron as for New Puddled. Higher prices are asked by manufacturers of all qualities, but this does not prevent jobbers from selling iron at 1.70¢ rates which costs them 1.75¢ delivered here. Competition in trade may be assigned as the excuse for the irregularity in price, and will likely continue until their stock of low-priced iron has been entirely exhausted. Manufacturers who contemplated advancing the price two weeks ago have thought it wise to defer the action until the volume of spring trade has been more fairly tested. It is evident, however, that they will not continue to sell iron at present prices any longer than what local necessity compels them to.

Old Rails.—There continues to be considerable activity in the demand. There are plenty of buyers who would be willing to pay \$22 @ \$25, but sellers have advanced their price to \$24, and some of them are holding as high as \$25. We hear of one lot of 1100 tons which has been offered, but buyers refrain from making any movement toward a purchase, except in a quiet way, and then only in small lots, unless they can buy at figures considerably below what is presumed to be a market price.

Structural Iron.—The market is beginning to revive. It is said that there is quite a fair trade doing from store in small lots, and that the prospect of having some good-sized orders placed at an early day is very good, as the staff will be wanted for early spring delivery. Thus far there has been no change announced in price, and it is presumed that those prevailing during 1885 will continue through the present year. Figures have recently been given on several contracts on this basis. Manufacturers predict a small advance on the price of Steel Beams, caused by the advance on raw material.

Track Supplies.—A quite active demand reported during the last two weeks. The

following prices have been named on specifications: Spikes, 2 1/2¢; Splice Bars, 1.80¢; Bolts with Hexagon Nuts, 2.95¢; do. Square Nuts, 2 1/2¢.

Black Sheet and Galvanized Iron.—In both classes the market is exceedingly quiet at present. Jobbers are having very little demand from store, and mill agents complain that large buyers are not placing orders in as large quantities as it was expected they would do after the first of the year. Prices on both classes continue tolerably firm at former quotations in a retail way, while makers of Galvanized Iron complain that there is no reason beyond sectional strife why they should not get better prices. Quotations heretofore named remain unchanged.

Old Wheels.—The demand continues quite active, and \$18 @ \$18.50 is said to be a fair market price, though sales have been made at less, and in some cases more, than these figures. Holders are asking \$19 @ \$20, and buyers offering about 50¢ @ 75¢ a ton less than market price.

Scrap Iron.—Market fairly active. No. 1 Wrought is quoted at \$19.25 for special selection, dealers asking this price for straight grading. No. 1 Mill is held at \$15 and No. 2 at \$10. Dealers are pretty well sold up on all grades, and have inquiries for stock which they cannot supply. No change is announced in purchasing price, and very little is offered.

Pig Lead.—No change in values since our last report, spot commanding \$4.40 @ \$4.42 1/2. Sales of 800 tons Common and Refined are reported, principally for spot, late January and early February delivery. The arrivals from the West are very light, and the quantity of Lead offering is small and confined to a few refiners. The demand continues large for the season.

Mr. David H. Bradley, formerly general manager of the Calumet Iron and Steel Co., has formed a copartnership, under the name of Bradley, Forsyth & Hyde, for the sale of Pig Iron; they have removed their office to No. 70 Dearborn street, Chicago. Mr. Bradley is also manager of the Bangor Furnace, and will give special attention to the sale of this brand of iron.

The Moore Mfg. Co., Chicago, state that their Patent Freight-Car Door Hangers have recently been adopted by the Chicago, Rock Island and Pacific Railway Co., Chicago, Milwaukee and St. Paul Railway Co., and Chicago and Northwestern Railway Co.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts.,
CHATTANOOGA, JANUARY 18, 1886.

The past week is one to be remembered by the South. The most intense cold weather has prevailed and has caused great damage to crops and general business. It is thought that not only the present orange crop is destroyed, but that the trees also are killed, which will take years to remedy. Oats and wheat have suffered to a great extent, and in some places are wholly destroyed. There has been nothing at all doing, and most of the houses might as well have shut up. The foundries have all been frozen out and are completely at a standstill. In the principal cities where they have water works the cellars are inundated and the streets flooded from burst pipes. The railroad trains have been very irregular, the freezing up of the water-tanks obliging many trains to be taken off and others running out of time. The merchants complain very much of slow collections. The low price of cotton is causing the planters to withhold it from market. Taking all the circumstances into consideration, a general feeling of depression seems to prevail throughout the entire community.

Pig Iron.—The feeling among the Pig-Iron producers is perhaps exceptional. Prices have been fully maintained, and the furnaces have no trouble in disposing of all their product. Sales are confined mostly to deliveries in the immediate future, as they are satisfied there will be no going back in the selling figures, but look for some advance early in the season. The sales to Southern foundries have been curtailed to some extent, some of the larger concerns only contracting for about one-half of what they intended to do some two weeks since. Quite a number of sales have, however, been made in lots ranging from 100 to 300 tons, on a basis of \$16 @ \$16.25 for No. 1, and \$1 less for No. 2; these appear to be about the ruling figures for small lots, while \$15.50 @ \$15.75 is the price obtained for large lots of 1000 to 5000 tons. Many of the furnaces will be a little off for a few days in consequence of a freeze up. Some of them have been obliged to stop in consequence of burst pipes, frozen ores, and general disarrangement of their daily business routine.

Hardware.—Merchants in this line of business will no doubt find their sales very much contracted for at least a few weeks to come, although there are certain lines that will not be as much affected as others. The sales of Hardware for builders' use will probably be brisk, as few of those who intended building will relinquish the undertaking.

Lumber.—The prospects for a large business in this line were never better than now. The mills in this district alone are under contract for probably not less than 15,000,000 feet. Prices have been steadily advancing for the last three months, and new contracts are hard to place even at present prices.

Birmingham.

BIRMINGHAM, ALA., JANUARY 18, 1886.

Business could not be much more irregular and harder to forecast intelligently from surface indications than it is about here just now. A very large proportion of the miners and furnace hands in this region (on whom a great deal depends, of course) are negroes, and the holidays are a worse disorganizer with them than with anybody else. Then the cold weather is especially hard on them, too, and the result of all this is that their employers have had to get along with short forces for the last 10 days. The output of the iron mines has run down considerably. The Pratt Coal and Iron Co. have not been able to dig Coal enough for their trade, and one furnace whose coke ovens they feed has had to bark for a few days, because it could not get Coal enough, and around most of the other stacks it has been necessary to suspend all extra work in the way of repairs or improvements in order to keep the fires going reliably. As for the demand, it is certainly good enough in every branch of the iron trade, and fuels are not going begging by any means. The event of the week was a visit from Mr. Jacob Reese, the basic-process man, of Pittsburgh. Expecting soon to get control of his process in the United States, as the result of his recent litigation with the Bessemer people and others, he came down upon the invitation of Col. Enoch Ensley, president of the Pratt Coal and Iron Co., to look into the conditions for making Steel here. According to his expressions to outsiders, his ideas so far are altogether favorable. Among the things that he has examined incidentally, and to his entire satisfaction, it seems, is the Pratt Co.'s natural gas. He says very positively that according to all the indications this is exactly of the same origin and character as the Pennsylvania gas, and may very reasonably be supposed to be sufficient in quantity to be serviceable.

Pig Iron.—The furnaces are having all they can do to supply their trade, though, with the allowance that suggests itself from what has been said above on the labor question, they are making more, and on an average better, iron than ever before. The increase of business from the West, especially in Foundry Irons, is still a feature of the trade. Prices are just about what they have been for a month, though stiff; but this now means prices actually governing to-day, for the furnaces have pretty well got clear of old contracts, so that on the bulk of their present sales they are getting the benefit of the advance. If anything, there is even less disposition than there has been to sell iron ahead.

Finished Iron.—Stubbornly stays about where it has been, with its materials commanding advanced prices steadily. Scrap iron is now up from \$2 to \$4 a ton, 95¢ @ \$1 a hundred being asked for future supplies. In No. 1 Railroad Scrap, which under old contracts is costing the mills 85¢, comparatively little was done at the mills here in Birmingham last week again. The principal trouble was the inadequacy of the force to supply the finishing department, a deficiency that will soon be remedied.

Miscellaneous.—Hardly any new business has come to the foundries and shops outside of the average run of orders for small specialties—mainly such as sell to business interests. Chains will in future be an item in these reports, the Birmingham Chain Works being just ready to commence operations. They have several orders from near home booked already.

Coal.—Most of the Coals of this State are selling freely now, but at low prices still. The interruption of regular supplies has caused something of a flurry in Coking Fuels, which, of course, has not the elements of endurance in it.

Cincinnati.

JANUARY 18, 1886.

Pig Iron.—The market in the past week remains substantially as before. It is reported by Pig-Iron sellers that orders for several thousand tons have been placed for delivery in the coming four or six months, and to cover the wants of foundrymen in this region to complete contracts for castings. The prominent demand for Pig Iron is for the foundries, Cast-Iron Water and Gas Pipes, Sewing Machines and School Furniture and the general "jobbing business." The Stove foundries and the Mantel and Ornamental Casting business draw their Pig Iron as needed from week to week. The large and varied business of the Agricultural Implement foundries and shops is reported to be fairly well supplied, yet some of them are making inquiry for present supply. The builders of Steam Engines throughout the South express no good encouragement for business. The rolling mills in this region and through the West and South claim brighter prospects for this year. Blast-furnace men in all the West and South report a better condition of their business than in the past two years. The following quotations on Pig Iron are f.o.b. here, or less the freight to Cincinnati when orders are filled direct from furnaces:

CHARCOAL FOUNDRY.

Hanging Rock, Best, No. 1, 4 mos.	\$20.50 @ 21.00
Hanging Rock, Good, No. 1, 4 mos.	20.00 @ 20.50
Hanging Rock, Good, No. 2, 4 mos.	19.00 @ 20.00
Tennessee Alabama and Georgia, No. 1, 4 mos.	18.00 @ 18.50
Tennessee Alabama and Georgia, No. 2	17.00 @ 17.50

COKE FOUNDRY.	
Southern No. 1, 4 mos.	18.00 @ 18.50
Southern No. 2, 4 mos.	17.00 @ 18.00
Ohio and West Pennsylvania, No. 1, 4 mos.	18.50 @ 19.50
Ohio and West Pennsylvania, No. 2, 4 mos.	17.50 @ 18.00

SILVER-GRAY SOFTENERS.	
Hanging Rock (Jackson County), No. 1, 4 mos.	19.00 @ 19.50
Hanging Rock (Jackson County), No. 2, 4 mos.	18.00 @ 18.50
Hanging Rock (Jackson County), No. 3, 4 mos.	17.00 @ 17.50
Other makes.	15.50 @ 17.50

CAR WHEEL.	
Southern Warm-Blast.	17.50 @ 19.00
Southern Warm-Blast Standard.	20.00 @ 25.00
Hanging Rock Warm-Blast.	19.00 @ 20.00
Hanging Rock Cold-Blast.	23.50 @ 26.00
Georgia Cold-Blast.	25.00 @ 26.00

SCRAP.	
Wheels, cash.	17.00 @ 17.50
Rails, cash.	20.00 @ 20.50

No sales reported of Forge Irons or Wrought or Cast Scrap. A discount for cash of 50¢ per ton is made from time quotations of Pig Iron.

Louisville.

W. B. BELKNAP & Co., Louisville, under date of January 18, report as follows: The absorbing topic for the past week has been weather rather than work, and observations on the thermometer have supplanted the predictions of spring business. Certainly if the latter will react as violently as the mercury, from minus 12, which it touched here, we shall have our hands full in due season. Something about every spell of weather has to be exceptional to make it interesting. In this case the oldest inhabitant pronounces it the longest continued low temperature that has ever been recorded here. In any event outdoor operations were necessarily suspended. There was no such thing as digging post-holes or laying foundations while the ponds were bearing a 6 inch ice crop. Individuals as well as fluids seemed to suffer congelation, from which they must recover before we expect much trade. The thawing-out process, however, is a natural one, and is bound to come as the sun rises higher in the heavens.

Bar Iron.—Is maintaining its late advances with firmness. A determination seems to have settled on the manufacturers not to waste their time and resources further in making and selling goods for nothing. This resolution is so widespread and so substantial that, accompanied with the willingness on the part of buyers to pay more when they see the mills in earnest, the advance seems more than likely to hold. A good deal of structural work, too, is projected for this year, which will necessarily call for large amounts of material.

Hoops and Bands.—These are very firm at an advance of about \$2 per ton over the lowest price reached.

Sheet.—There is a somewhat better feeling in Sheet, and large orders have been refused at prices at which similar ones were taken some 60 or 90 days ago. It seems pretty well settled that we shall not see as low prices this coming season for the light gauges as at one time prevailed in this market last year.

Steel.—The advance consequent upon the meeting of the Steel manufacturers last week in Pittsburgh is well received by the trade at large. The large orders for Steel Rails which have been placed, and the scarcity of Bessemer stock, the ruinous figures which prevailed before, are all plainly recognized and go to give backbone to the movement. Classification of Machinery Steel, too, has been long desired, and if the manufacturers will only adhere to it strictly, as the nail-makers do to their card, for instance, they will have effected a most desirable end. Tire, Round Machinery, Toe Calk, Plow Slabs and Shapes have all advanced fully 1/2¢ per lb. The demand for all these goods is fair and promises to be better as the season progresses.

Nails.—Are firm at present prices. There is a larger demand for these than one would imagine during even the extreme weather. Certain rumors of labor troubles reached this market which may or may not affect the prices more decidedly later on. Navigation in the river has been suspended; hence a local advance has been asked to cover the difference in freight. The advance in Wire Nails of another 5¢ has little effect. Those who are using them will keep on doing so as their superiority becomes acknowledged for certain classes of work.

Horseshoes.—An advance has taken place in Burden Shoes consequent upon an increased rate of freight from Troy to Western points. Other Shoes are unchanged.

Wire.—The advance by the manufacturers, in session in New York on the 13th inst., will, we presume, finish the booming, for the present at least, from that end of the line.

Barbed Wire.—Business is rendered more or less interesting by the cross-fire circulars from licensees and moonshiners. The latter become more audacious as the former grow more positive. Meanwhile we fancy the trade are pretty generally taking mainly licensed Wire.

GEORGE H. HULL & Co., of Louisville, report to us as follows under date of January 18: The market for Pig Iron is even firmer than at the date of our last report. Nearly all of the Southern furnaces have withdrawn from the market, and decline to make any further sales until they have made more progress with their deliveries. Car-Wheel Irons have stiffened up, and are held at \$1 or \$2 per ton higher. Large sales of Wheel Irons have been made at prices nearly \$4 per ton higher than the same brands sold for three months ago. We quote for cash as below:

PIG IRON.	
Southern Coke, No. 1 Foundry.	\$18.00 @ 18.50
" " " " " "	17.00 @ 17.50
" " " " " "	16.50 @ 17.00
Hanging Rock Coke, No. 1 Foundry.	18.00 @ 18.50
Hanging Rock Charcoal, No. 1 Foundry.	19.00 @ 20.00
Southern Charcoal, No. 1 Foundry.	18.00 @ 19.00
Silver Gray, different grades.	16.50 @ 17.00
Southern Coke, No. 1 Mill, Neutral.	18.00 @ 18.50
" " " " " "	15.00 @ 15.50
" " " " " "	15.50 @ 16.00
" " " " " "	16.50 @ 17.00
White and Mottled, different grades.	13.00 @ 13.50
CAR WHEEL.	
Southern Car-Wheel, standard brands.	21.00 @ 25.00
Southern Car-Wheel, other brands.	18.00 @ 21.00
Hanging Rock, Cold-Blast.	25.00 @ 26.00
" " " " " "	19.00 @ 21.00
" " " " " "	20.00 @ 21.00

Trade Report.

General Hardware.

The market does not present any specially new features this week. But few changes in price are announced, and these are almost uniformly in the direction of advance. The tone of the trade is hopeful, and anticipations are freely expressed that the coming season's business will be very satisfactory.

NAILS.

The market continues irregular, through the anxiety of a few sellers. The majority of the mills decline to meet the low figures thus made on carload lots, and insist upon, and occasionally obtain, considerably better figures. The intrinsically favorable statistical position of Nails is unchanged, and, while makers are probably more generally accumulating stocks to a moderate extent, it is likely that these reserves will be rapidly swept away by the opening of the spring demand. We quote nominally \$2.40 to \$2.50 from store.

S. A. Haines & Co., 90 Chambers street, have perfected arrangements to carry a stock of Bellefonte Nails for the convenience of the local trade.

BARB WIRE.

The market is quiet and firm. So far as the indications at hand until now go, the demand for Barb Wire from the country will be heavy in the coming season. We quote 4.62 1/2 cents for carload lots of Four-Point Barb Wire, 4.75 cents for 3-ton lots and 5 cents for small lots. The Western trade is being agitated by the manifestos sent out by a number of unlicensed manufacturers, the circulars of the Crescent Mfg. Co., of St. Louis, Mo., and of the American Barb Wire Co., of the same city, being particularly emphatic.

WIRE.

At a meeting of the Wire manufacturers held last week, a further advance was made in prices. The market in this line is decidedly firm, and the following are the new quotations:

Annealed Bright Market Wire, 0 to 18, dis. 70 %
Coppered Market Wire, 0 to 18, dis. 67 1/2 %
Galvanized Market Wire, 0 to 18, dis. 62 1/2 %
Tinned Market Wire, 0 to 18, dis. 62 1/2 %

MISCELLANEOUS PRICES.

A meeting of the Executive Committee of the United Scythe Manufacturers' Association was held on the 13th inst., at Springfield, Mass., when the following concerns were represented:

NORTH WAYNE TOOL CO., Hallowell, Me.
DUNN EDGE TOOL CO., Oakland, Me.
EMERSON, STEVENS & CO., Oakland, Me.
HUBBARD & BLAKE MFG. CO., Oakland, Me.

MASCOMA EDGE TOOL CO., Lebanon, N. H.
EMERSON EDGE TOOL CO., Lebanon, N. H.
NEW LONDON SCYTHE CO., New London, N. H.

S. A. MALLARD MFG. CO., Clayville, N. Y.
WINSTED MFG. CO., Winsted, Conn.
G. & M. NOLAN, Skowhegan, Me.
H. KNICKERBACKER, Balston Spa, N. Y.

Reports received from all quarters are referred to as indicating that prices were being firmly held, and it was unanimously decided to maintain the prices now existing.

The indications of animated competition in the Chicago market, growing out of the conflicting interests and rivalry of some of the large wholesale houses well known to the trade, is not regarded as favoring the movement which has been for some time on foot looking toward the maintenance of prices on the part of the jobbers.

Augers and Bits are generally held more firmly, some of the manufacturers refusing to make the extreme quotations that were made last season. The present prices are referred to as unprofitable, the animated competition keeping them where they are.

An improvement is noticeable in Cast Iron Butts, most of the manufacturers having advanced their quotations. A fair stock of these goods is, however, in the hands of jobbers, and it is a question whether the market will at once show the effect of the advanced prices. Wrought Iron Butts are held without change, and no movement looking toward an advance is announced, although the goods are referred to as very low at present prices. The stock of these goods in the hands of the trade is supposed to be considerable.

Slightly advanced quotations are made on Chain, but there is a considerable divergence in the prices named by the different manufacturers. The tone of the market is, however, toward higher figures.

It is remarked that the new prices on Locks are adhered to much more closely than were the old. The reduction in price has the effect of preventing the cutting of prices that prevailed of late to such an extent, and the list being made more even, manufacturers cannot afford to make leaders of certain styles in the hope of getting a return from other goods which were quoted unreasonably high. Competition among the different makers is, however, earnest, and the outside manufacturers are looking after their interests as carefully and aggressively as heretofore. Some of the manufacturers of Knobs are receding from the extreme prices recently made by them.

W. S. Hammond, Lewisberry, York County, Pa., requests us to announce that the price of his Window Springs will be advanced from 5 to 10 per cent. March 1.

A. Nelson, the Salem Nail Co., 295 Pearl street, New York, issues a circular relating to the following line of Staples, which are described and illustrated, with the quotations given below:

Galvanized Wire Staples for Soft Wood.
Galvanized, 1 1/4, 1 1/2, 1 3/4, 1 1/2 and 2 inch, per keg..... \$4.00

Galvanized Hard Wood Hooks or Staples.
2 1/4 inches long (see cut), per keg..... \$6.00
2 inches long (see cut), 90 to the pound, Galvanized, per keg..... 10.00

Wrought Hand Made.
Galvanized, per keg..... \$13.00

Hammer & Co., Brauford, Conn., issue circulars describing their Malleable Iron Clamps, Lamps and Oilers, a line of goods which are well known to the trade. The following is the list of the Malleable Iron Oilers, in the style of which, our readers will remember, they have recently made modifications and improvements, the discount being 10 per cent.:

No. 1, per dozen..... \$3.60
No. 2, per dozen..... 4.00
No. 3, per dozen..... 4.40

Their Malleable Iron Hand Lamps, with oil tubes, kerosene screws, are sold at \$5 per dozen, subject to a discount of 10 per cent., and their Malleable Iron Founts, B size, kerosene screw, without burners, are sold at \$8.50 per dozen, subject to a discount of 20 per cent. The following is their list of Patent Adjustable Malleable Iron Clamps, which is subject to a discount of 20 per cent.:

3 inch, per dozen..... \$4.50
4 inch, per dozen..... 5.00
5 inch, per dozen..... 5.50
6 inch, per dozen..... 6.00
8 inch, per dozen..... 11.50

The following is their list of Heavy Pattern Screw Clamps, which is subject to a discount of 40 and 10 per cent.:

2 inch, per dozen..... \$2.25
3 inch, per dozen..... 2.50
4 inch, per dozen..... 2.75
5 inch, per dozen..... 3.00
6 inch, per dozen..... 3.25
8 inch, per dozen..... 3.50

A slightly better condition as regards prices of Table Cutlery is observable, and the increased cost of Tin, Cocobolo and Ebony are referred to as contributing to this result. Prices, however, rule low, and competition is animated.

RICHARDSON BROTHERS,

Newark, N. J., in their supplement, January 1, 1886, to which we referred in our last issue, illustrate the following Saws, which have recently been added to their line, the discount being 25 and 5 per cent.:

California Pattern Pruning Saw.
Ground taper thin to back, per dozen..... \$7.25

Double Edge Pruning Saw.
Lightning on one edge fine tooth on the other.
Inch..... 12 14 16 18 20 22
Per dozen..... \$8.00 8.50 9.00 10.00 11.00 12.00

Richardson's Steel Clad Wood Saws.
Excelsior Boys' Wood Saw and Buck.
Painted red, per dozen..... \$11.25

Timber Saw No. 7 Style.
Length, inches..... 26 30 34 38 42
Price, per dozen..... \$21.50 25.00 29.00 34.00 38.00

Timber Saw No. 8 Style.
Length, inches..... 30 34 38 42 46
Price, per dozen..... \$22.50 26.00 30.00 35.00 40.00

Saw Handles in Addition to Page 66.
No. 12 Saw Handles, 26 to 28 inch, per dozen..... \$5.00
No. 12 Saw Handles, 18 to 22 inch, per dozen..... 4.75
No. 12 Saw Handles, 22 to 24 inch, per dozen..... 4.00
No. 12 Saw Handles, 24 to 26 inch, per dozen..... 4.50

The American Tooth One Man Crosscut Saw is illustrated and the following prices given, which are subject to a discount of 45 and 10 per cent.:

Feet..... 3 3 1/4 4 4 1/4 5 5 1/4
Each..... \$2.75 3.00 3.50 4.00 4.50 5.00

Hyde's Improved Miter Box is also illustrated and described and the following list prices given, on which there is a discount of 15 per cent.:

With 18-inch Saw..... \$3.50
With 20-inch Saw..... 3.75
With 22-inch Saw..... 4.00
With 24-inch Saw..... 4.25
With 26-inch Saw..... 4.50
With 30-inch Saw..... 5.00

THE GOODSELL CO.,
Antrim, N. H., for whom the Alford & Berkele Co. are special agents, 77 Chambers street, New York, issue a revised edition of their illustrated and descriptive price list, which contains some slight changes in price and the addition of some new patterns. The following is the list of some of the principal new patterns of Knives and Forks which have been added, the styles of which are illustrated in the catalogue, the discount being 33 1/2 per cent.:

Scale Tangs, with Ring Bolster.
Coco, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 1224 2224 3224
Table Knives and Forks..... \$14.00 \$15.00 \$18.00
Table Knives only..... 16.67 17.67 20.67

Cimeter Blade.
Table Knives and Forks..... 15.67 16.67 19.67
Table Knives only..... 18.34 19.34 22.34

Scale Tangs, with Ring Bolster and Cap.
Coco, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 1224 2224 3224
Table Knives and Forks..... \$18.00 \$19.00 \$22.00
Table Knives only..... 20.67 21.67 24.67

Cimeter Blade.
Table Knives and Forks..... 19.67 20.67 23.67
Table Knives only..... 22.34 23.34 26.34

Scale Tangs, Ornamental Handle, with Bolster.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 1211 2211 3211
Table Knives and Forks..... \$15.00 \$16.00 \$19.00
Table Knives only..... 17.67 18.67 21.67

Cimeter Blade.
Table Knives and Forks..... 16.67 17.67 20.67
Table Knives only..... 19.34 20.34 23.34

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 1211 2211 3211
Table Knives and Forks..... \$19.67 \$20.67 \$23.67
Table Knives only..... 22.34 23.34 26.34

Cimeter Blade.
Table Knives and Forks..... 21.34 22.34 25.34
Table Knives only..... 24.00 25.00 28.00

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 1211 2211 3211
Table Knives and Forks..... \$19.67 \$20.67 \$23.67
Table Knives only..... 22.34 23.34 26.34

Cimeter Blade.
Table Knives and Forks..... 21.34 22.34 25.34
Table Knives only..... 24.00 25.00 28.00

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 1211 2211 3211
Table Knives and Forks..... \$19.67 \$20.67 \$23.67
Table Knives only..... 22.34 23.34 26.34

Cimeter Blade.
Table Knives and Forks..... 21.34 22.34 25.34
Table Knives only..... 24.00 25.00 28.00

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 1211 2211 3211
Table Knives and Forks..... \$19.67 \$20.67 \$23.67
Table Knives only..... 22.34 23.34 26.34

Cimeter Blade.
Table Knives and Forks..... 21.34 22.34 25.34
Table Knives only..... 24.00 25.00 28.00

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 1211 2211 3211
Table Knives and Forks..... \$19.67 \$20.67 \$23.67
Table Knives only..... 22.34 23.34 26.34

Cimeter Blade.
Table Knives and Forks..... 21.34 22.34 25.34
Table Knives only..... 24.00 25.00 28.00

Scale Tangs, Ornamental Handle, with Bolster and Cap.

Coco, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 1223 2223 3223
Table Knives and Forks..... \$18.67 \$20.00 \$23.33
Table Knives only..... 21.34 22.67 26.00

Cimeter Blade.
Table Knives and Forks..... 20.34 21.67 25.00
Table Knives only..... 23.00 24.34 27.67

Scale Tangs, with Ring Bolster.
Coco, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,214 20,214 30,214
Table Knives and Forks..... \$18.67 \$20.00 \$23.33
Table Knives only..... 21.34 22.67 26.00

Cimeter Blade.
Table Knives and Forks..... 20.34 21.67 25.00
Table Knives only..... 23.00 24.34 27.67

Scale Tangs, with Ring Bolster and Cap.
Coco, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,224 20,224 30,224
Table Knives and Forks..... \$19.67 \$21.00 \$24.33
Table Knives only..... 22.34 23.67 27.00

Cimeter Blade.
Table Knives and Forks..... 21.34 22.67 26.00
Table Knives only..... 24.00 25.34 28.67

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,211 20,211 30,211
Table Knives and Forks..... \$19.67 \$21.00 \$24.33
Table Knives only..... 22.34 23.67 27.00

Cimeter Blade.
Table Knives and Forks..... 21.34 22.67 26.00
Table Knives only..... 24.00 25.34 28.67

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,211 20,211 30,211
Table Knives and Forks..... \$19.67 \$21.00 \$24.33
Table Knives only..... 22.34 23.67 27.00

Cimeter Blade.
Table Knives and Forks..... 21.34 22.67 26.00
Table Knives only..... 24.00 25.34 28.67

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,211 20,211 30,211
Table Knives and Forks..... \$19.67 \$21.00 \$24.33
Table Knives only..... 22.34 23.67 27.00

Cimeter Blade.
Table Knives and Forks..... 21.34 22.67 26.00
Table Knives only..... 24.00 25.34 28.67

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,211 20,211 30,211
Table Knives and Forks..... \$19.67 \$21.00 \$24.33
Table Knives only..... 22.34 23.67 27.00

Cimeter Blade.
Table Knives and Forks..... 21.34 22.67 26.00
Table Knives only..... 24.00 25.34 28.67

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,211 20,211 30,211
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Table Knives and Forks..... 21.34 22.67 26.00
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Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,211 20,211 30,211
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Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,211 20,211 30,211
Table Knives and Forks..... \$19.67 \$21.00 \$24.33
Table Knives only..... 22.34 23.67 27.00

Cimeter Blade.
Table Knives and Forks..... 21.34 22.67 26.00
Table Knives only..... 24.00 25.34 28.67

Scale Tangs, Ornamental Handle, with Bolster and Cap.
Purple-wood, Ebony, Bone, No. gross. No. gross. No. gross.
Straight Blade..... 10,211 20,211 30,211
Table Knives and Forks..... \$19.67 \$21.00 \$24.33
Table Knives only..... 22.34 23.67 27.00

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THE ARRANGEMENT OF HARDWARE STORES.

It is gratifying to notice the interest that is taken by the trade throughout the country in the different suggestions that have been presented in these columns, both in regard to the general arrangement of stores and the different devices which are recommended by our numerous correspondents. Apart from the general advantage that results from having the attention of the trade called to this matter, thereby causing more thought and attention to be given to it, the contributions on the subject are found to be of service in directing the attention of the Hardwaremen to existing defective, faulty and crude methods. As might be expected, many different opinions are expressed concerning the different plans and suggestions, and it is amusing to note that a device which is condemned by one Hardwareman as impracticable is heartily approved by another as the best thing he has yet seen. This would naturally be the case from the widely different circumstances in which Hardwaremen find themselves situated, so that an arrangement or device which would be just the thing for another. It is for this reason that we lay before our readers, including as they do the entire trade, from the retailers of the country towns and villages to the largest jobbers of the cities, different methods and plans, all of which will be of service to some. But we desire to impress upon our readers that the primary object of this discussion is to call their attention to the extreme importance of having a neat, well-arranged and attractive store, in which the best methods of handling, storing and sampling goods are used, with the hope that hardwaremen generally will apprehend that there may be in their business much more convenience of arrangement, efficiency of display and economy of time and help than are generally secured. At the same time we doubt not that suggestions given concerning details will be of practical service to many.

The following letter from a Hardware house in Michigan refers fully and satisfactorily to the arrangement of their store, and will be readily understood by the aid of the accompanying diagram:

We are glad to see that there is an interest taken by dealers throughout the country in regard to the better arrangement of Hardware stores, as we have noted by the several communications which have already appeared in your paper. We do not know that we can give any suggestions that will be of any great assistance to any one, as your readers must be governed entirely by the size and shape of the store and the class of goods they carry. About a year ago we moved into a new store, which was newly fitted up throughout for our special use. Our suggestions and plans were given to an architect and drawn to a scale, and the entire work was let by contract. All of the woodwork was finished in Norway pine, with three coats of hard oil.

The store shown in Fig. 1 is L-shaped, having a frontage to the north of 19 feet in width from wall to wall; 25 feet back from front it widens to 24 feet. The depth of store from front to south wall of the L part is 117 feet; the L fronts to the west and is 17 feet wide by 51 feet deep. The height of the store from floor to ceiling is 15 feet and 1 inch. We have a basement under the whole store, with a cemented brick floor, and there are two stories over the L part only. The second floor we use for keeping a duplicate stock of Stoves, Tinware, &c. The third floor we use for a tinshop. We have a freight elevator in the southeast corner of store, running from basement to the third floor. Directly north of this we have a small dumb-waiter running from store to tinshop, for carrying up light goods for repair, &c. Next north of the dumb-waiter we have a Rope Rack made of plank 2 inches thick, 12 inches wide, and running from floor to ceiling. These planks are cut in, giving openings so as to receive reels which have 2-inch axles with a head on each end. The heads are made different in size of diameter, so as to receive just a coil of rope. The sides of the upright pieces should be beveled, so as to give it a finish and keep the plank from warping. This Rack will hold all sizes of both Sisal and Manila, from 1/4-inch to 3/4-inch.

On the west side of the main store, commencing from the north, is our shelving for General Hardware, and it extends back about 61 feet. Commencing from the floor we have two rows of drawers running back the full depth of base, about 32 inches. Commencing from the base, the shelving runs clear to the ceiling, with a small plain cornice. In the center of shelving we have a Case 12 feet 3 inches long by 7 feet high. It has four sliding doors. We use it for sampling Mechanics' Tools, such as Saws, Planes, Squares, Chisels, &c. For sampling the Saws in this Case we have a row of pins across the top, made of gas-pipe, screwed into a flange, with a cap on the end to keep the Saws from falling off. These pins are painted as near the color of the woodwork as we could get them. Commencing with the first shelf above the base (omitting the first space and one tier of shelves from base to ceiling on both the north and south end of shelving) up to the top of the Tool Case, the shelves are all spaced 7 inches apart in the clear and 36 inches from standard to standard, by 18 inches deep. On this space of shelving we use all wood sample boxes with ash fronts, finished in hard oil, and on the lower side of box we have a black enameled knob with a tinrod round head screw. On the same sized boxes these knobs are put in the same place, and looking at the front of shelving and boxes have a uniform appearance, and being plain do not detract from the sample on the face of box. Above the boxes there are four shelves 10 1/2 inches apart. On these are kept duplicate stock, in

original packages, of as near the same class of goods as are sampled on the boxes below as it is possible.

We are decidedly in favor of the sample boxes, for the following reasons:

1. It always gives the appearance of a full and clean front, however low or broken your stock may be.

2. It displays to better advantage more goods than could be put into cases that would fill the store.

3. It enables the purchaser to readily select the article desired many times when he is unable to secure it.

4. It always makes one place for each article, and it will be found there every time.

5. It saves time and labor in dusting, in keeping stock in shape, and enables the clerk to wait upon customers more promptly and with less confusion.

6. It gives order and neatness to the store which cannot be had in the old way.

For these reasons and many more which could be named we believe the box system is by far the best of anything yet used for the purpose, and every one who has given them a thorough trial will, we think, corroborate us in our statement. It is our opinion that the most of those who decry the box system are those who at some time have had a few boxes nailed together, covered the ends of them with green paper, or had them painted the same color, and from their experience with these condemn the whole system. If this has been their experience we will agree with them in such a case that boxes are a nuisance. We believe that the only color suitable for a box front is the natural wood, with an oil finish. We prefer ash, and think the whole interior of a store should be of the same color as near as possible, to produce a harmony of effect which adds greatly to the appearance.

On the first shelf above case is an iron track made of 3/4 x 1 1/4 inch wrought iron. This is fastened to every alternate standard by a wrought-iron bracket. On this track we use two patent Lockett ladders, having two anti-friction sheaves on each. With this we are enabled to go from one end of the shelving to the other without descending, and reach any point on the face of shelving from base to ceiling. They are always in place, and with a high shelving they are indispensable.

Commencing first on the shelving from the front of store in the tier without drawers we keep bronzed goods in their original packages. In the first tier of drawers Morise Locks and Latches; second tier, Rim Locks and Latches; third tier, Cupboard Catches, Sash Fasteners, Shutter Bars, Drawer Pulls, Chest Handles, Barrel, Flush

room which has heretofore been lost. Above this we have space on the wall for sampling Picks, Mattocks, Grub Hoes, &c., and also for long hooks on which we hang Buck Saws. For the other smaller goods we use Sargent's Baggage Hook. In front of the Glass Rack we have a Glass Counter. It is made to correspond with the other counters of the store, except the top, which is made of 2-inch square pine strips nailed and glued together. On the outer edge we have a steel bar of 3/4 by 1 inch, drilled every inch with a 3/8-hole. On the end of our straight edge we have a pin which fits into the holes.

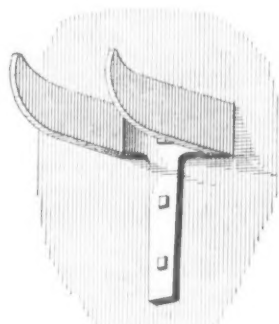


Fig. 3.

This enables the cutter to hold the straight edge securely. The top of the Counter is also marked off in inches.

Commencing again at the front end of main store on the east side, which we principally devote to our housekeeping department, we have first a deep Case with sliding doors. It is about 32 inches deep, 7 feet high and 22 feet long. Below the Case we have first two tiers of narrow drawers for drawing paper, &c., kept in connection with our art department, and the rest are cupboards with panel doors. Inside they are ceiled perfectly tight, excluding dust and dirt. Above the Case we have shelving of the same depth used for Japanned goods, such as Toilet Ware, Bath Tubs, Slop Jars, Cake Boxes, &c. In this Case we keep fine goods, such as decorated Coal Vases, Brass and Bronze Fire Iron Sets, Fine Teapots, &c. Commencing next from where the store enlarges we have another row of shelving from the floor to the ceiling, 8 inches deep and about 45 feet long. The shelving is spaced 35 inches between the standards, and varies in height according to the class of goods kept on the shelves.

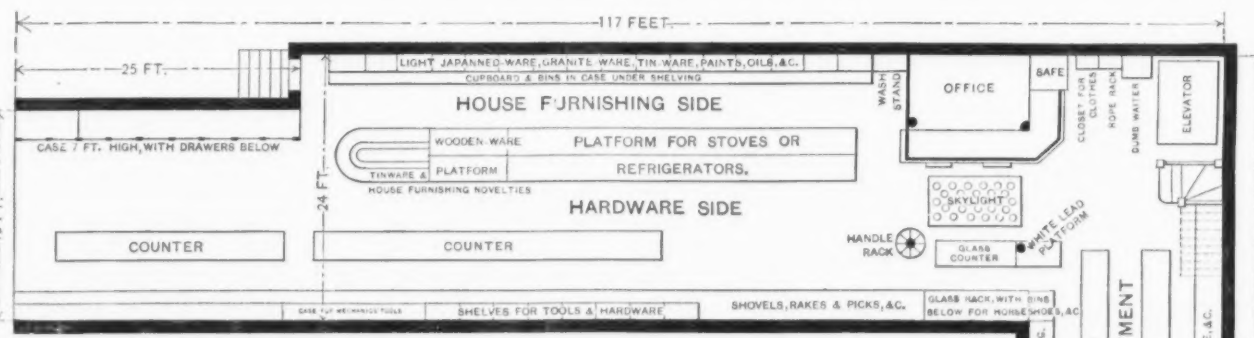


Fig. 1.—Diagram of Arrangement of Store.

and other Bolts; fourth tier, Butts of every description; fifth tier, wrought goods, Screw Eyes, Hooks, Hasps, Staples, &c., endeavoring to keep the same class of goods as near together as possible. Next south of the Tool Case we commence with Mechanics' Tools, Bits, Augers, Screw Drivers, Brad Awns, Tool Handles, Chisels, Gouges, Hammers, Wrenches, and in the last tier we have Carriage, Tire and Stove Bolts. These boxes are all lettered and numbered plainly the size contained in each drawer. The two rows of drawers under the base are lettered, giving the contents of each. This whole space being filled, it leaves no place for an accumulation of dirt, and goods contained in the drawers are kept clean.

From the south end of the shelving to the north wall of the L part the side wall is ceiled in Norway pine from floor to ceiling. On the floor is a base the same width as base under shelving (32 inches) and 18 inches high from floor, and extends in length the same distance as ceiling on the side wall, about 25 feet. On the south end we have a Glass Rack about 9 feet long by 6 feet high. Under the base it is divided into compartments for holding Horsehoes, Barn-Door Rollers, Strap and T Hinges and other goods of this class. On this low base between shelving and Glass Rack we keep Shovels, Spades, Forks, Rakes, Hoes, &c. For holding them in place we have a staple made of 1/4 by 1 1/2 inch bar iron, Fig. 2, and screwed to

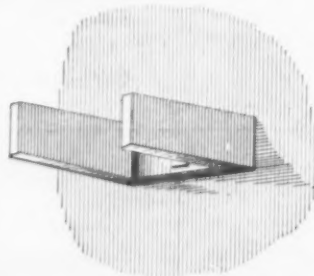


Fig. 2.

the wall about 4 3/4 feet from the base, for the long-handled Shovels, Forks, &c. The staple is made wide enough to just take up handles side by side, and long enough to stack them to the edge of the base between staples. For the D-handled goods we have a staple made narrower and turned up a little at the end, also a strip running down, as shown in Fig. 3, to give it strength. This staple is made narrow, just so that the D part can pass easily over and hang from the staple between the long-handled goods. This utilizes all the

Foreign Markets.

FRANCE.

PARIS, January 8, 1886.—Metals.—The week shows a decided change for the better, both in the demand and prices, all Metals, if we except Spelter, being higher. We quote at the close in francs: 100 kg.: Copper—Cath Bars, 106.35 @ 110; Ingots and Slabs, 115; Best Selected, 117.50; and Pure Corrocor Ore, 110. Tin—Banca, 255; Billiton, Straits and Australian, 250, and English, 247.50. Lead, 30 @ 31, and Spelter, 40 @ 41.50. Iron.—The week has opened with the encouraging feature of some money having been voted to be spent on public works in this city; this is all the more welcome since quite a line of different occupations connected with house-building, Structural Iron manufacture, as well as that of Railroad and Tramway material, suffered for some past from lack of work in this city and suburbs, so that the hands there idle may now find remunerative and steady employment. Add to this the revival of confidence in political matters at home, and it must be confessed that the year could have been ushered in under worse auspices. We quote Merchant Iron 18 francs in this city; do., for Floors, 12; Charcoal Merchant, 24; Sheets, 17 @ 25, and Wire Nails No. 18 in bulk, 37. The good effect of the favorable change there has hardly had time to be much felt in the Northern Departments, but when the improvement reaches them it will be all the more vigorous, as stocks there have been allowed to run quite low. In the Ardennes the market has been quiet and unaltered. The Haute-Marne is steady at 14 @ 15 francs for Coke Merchant and Mixed. Coal active.—Moniteur des Interets Matériels.

BELGIUM.

BRUSSELS, January 8, 1886.—Iron.—As had been anticipated, the new year has been inaugurated with a growing confidence in the immediate future of the iron market, a certain degree of buoyant feeling arising from the fact that the export trade among us gets to be quite lively. Holland is buying railroad material and bridges not only for its own use, but for Java, which is always a good sign, inasmuch as, once commenced, railroad building in Netherlands India usually keeps steady for a year or two. It is rumored that even for the United States Steel Sleepers have been ordered in this country. But, however this may be, we are glad that the expected revival in iron industry in Belgium is started by foreign orders, inasmuch as it will cause domestic consumers to at length cast aside their timidity and hesitation. When foreigners show that they consider our Iron and Steel prices invitingly low, our own consumers may also be converted to a similar belief. Luxembourg quotes Puddling Pig still as low as 3.90, and Foundry, 4.20 @ 4.30; Charleroi, 4 @ 4.70, and 6.75 respectively. We quote Merchant No. 1, 10 francs; No. 2, 10.75; No. 3, 11.50; Beams, 9.75 @ 10.75; Angles, 11 @ 12; ditto for ship, 13; Sheets No. 2, 12.50 @ 12.75; No. 3, 14.75; Commercial, 14.75, and No. 4, 22.75. Coal—Has been active and well supported, but there is no further advance.—Moniteur Industriel.

GERMANY.

HAMBURG, January 8, 1886.—Iron.—While Upper Silesian rolling mills have succeeded in forming a combination, Borsig insisting that the blast furnaces have not, the demands upon the Ring and Laura works being more than the director, Mr. Richter, feels justified in submitting to. Meanwhile the Rhenish Westphalian iron market has opened the year with increased firmness, but so far not developing great activity. Sheets remain inactive, but Wire Rods are looking up. Puddling

will put them out of competition in the market with Ohio furnaces, which for the first time for the best brands will be able to make nearly as low prices. For present quotations we should give the market about as follows:

Lake Superior Charcoal, Nos. 1, 2 and 3.....	\$23.00 @ \$24.00
Lake Superior Charcoal, Nos. 4, 5 and 6.....	21.00 @ 22.00
Lake Superior Coke, All Ore.....	21.50 @ 22.50
Lake Superior Coke, Cinder Mixed.....	20.00 @ 21.00
Standard Ohio Blackband.....	21.50 @ 22.50
Southern No. 2.....	19.00 @ 20.00
Southern Silvery, Open.....	18.50 @ 20.00
Southern Silvery, Close.....	18.00 @ 18.50
No. 1 Southern Mill.....	17.50 @ 18.50
American Old Iron Rails.....	23.00 @ 25.00
Old Wheels.....	18.00 @ 20.00

St. Louis.

W. H. SHIELDS, 305 Olive street, St. Louis, reports, under date of January 18: The market is fairly active, with considerable inquiry. There is little disposition by furnacemen to sell for future delivery, even at the advance, which is fully maintained. I quote nominally as follows:

MISSOURI.....	\$17.50 @ \$18.50
Southern.....	18.50 @ 19.50
MISSOURI.....	17.50 @ 18.50
Southern.....	17.50 @ 18.50
American Scotch.....	18.00 @ 21.00
MISSOURI.....	16.00 @ 17.00
Southern.....	16.00 @ 16.50
CAR-WHEEL AND MALLEABLE IRONS.....	22.00 @ 25.00
Lake Superior.....	21.00 @ 24.00
Old Wheels.....	16.00 @ 17.00
Old Rails.....	21.50 @ 22.00
Connellsville Coke (East St. Louis).....	5.30 @

Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending Jan. 19, 1886:

Hardware.	Stetson Geo. W. & Co., Pig, tons, 200
Baldwin Bros. & Co., Gun barrels, cs. 5	Castings, pkgs., 18
Baker Hermann & Co., Hardware, cutlery & guns, pkgs., 189	Rails, 339
Curley J. & Bros., Mills, case, 1	Bolts, cs. 70
Field Alfred & Co., Anvils, 50	Pig, tons, 966
Heiter & Lisom, Cases, 19	Ore, kg., 110,000
Henderson Bros., Guns, case, 1	Rods, bbls., 192
Knauth Nachod & Co., Ironware, csks., 10	Cask, 1
Lackawanna Line, Arms, cs. 27	Rods, pkgs., 11,812
McCoy & Sanders, Ironware, pkgs., 5	
Marcus J., Case, 1	
Pim, Forwood & Co., Guns, cs. 2	
Pitkin & Holdsworth, Machinery, cs. 19	
Schutte Wm. & Co., Cases, 13	
Seeley & Howell, Cases, 2	
Vom Cleave & Co., Mills, cs. 10	
Waefelner Hook nails, kegs, 59	
Wiebusch & Hilger, Hardware and cutlery, pkgs., 63	
Arms, cs. 5	
Witte John G. & Bro., Cutlery, cs. 6	
Needles, case, 1	
Order.	
Anvils, 172	
Chains, cask, 1	
Machinery, csks., 4	
Machinery, cs., 34	
Iron.	Metals.
Coddington T. H. & Co., Sheets, bbls., 372	Bruce & Cook, Terne plates, bxs., 30
Sheets, bxs., 19	Black plates, bxs., 127
Crocker Bros., Pig, tons, 300	Central Stamping Co., Tin plates, bxs., 282
Downing R. F. & Co., Orders, 273	DeMott H. R. & Co., Tin plates, bxs., 500
Lundberg Gust., Bars, 3849	Drexel Morgan & Co., Tin plates, bxs., 3701
Morton, Bliss & Co., Rolled beams, 60	Drexel & Co., Tin plates, bxs., 701
Naylor & Co., Pig, tons, 280	Erle and G. W. Dis., Tin plates, bxs., 342
Spiegel, tons, 56	Fraser Jas., Tin, pkgs., 266
Pierson E. L. & Co., Pig, tons, 10	Headly & Co., Yel. met., pkgs., 5
	Copper, bag, 1
	Padua V., Copper, case, 1
	Phelps, Dodge & Co., Tin plates, bxs., 23,111
	Black taggers, bxs., 340
	Thompson A. A. & Co., Tin plates, bxs., 966
	Order.
	Tin pbs., bxs., 31,305
	Spelter, plates, 3725
	Tin, bxs., 257
	Ingots, bbls., 5

The imports of Cutlery, Hardware and Metals at this port during the week ended January 15 were as follows:

	Quantity.	Value.
Anvils.....	3 @ 2	\$4,372
Antimony.....	1	87
Brass goods.....	22	2,408
Bronzes.....	10	481
Clocks.....	28	1,585
Chain and anchors.....	41	1,944
Copper.....	1	2
Cutlery.....	120	36,053
Dutch metal.....	15	2,413
Electrotype.....	8	522
Gas fixtures.....	26	6,494
Guns.....	16	1,924
Hardware.....	324	2,050
Iron, pig, tons.....	25	1,894
Iron, sheet, tons.....	745	25,582
Iron, spigot, tons.....	1,972	4,282
Iron ore, tons.....	1,664	27,901
Lead, pigs.....	134	9,831
Machinery.....	415	29,826
Metal goods.....	5	155
Nails.....	32	12,426
Needles.....	1	6,283
Old metal.....	2	6,190
Platina.....	18	1,519
Plated ware.....	16	1,184
Percussion caps.....	39	3,102
Pins.....	110	910
Pumbaro.....	50	2,450
Saddlery.....	2	82
Steel.....	71,583	67,472
Spelter.....	25,449	9,067
Tin, bxs.....	25,957	96,913
Tin, 5,891, slabs; 10.....	1,153,001	327,527
Wire.....	7	1,284
Zinc oxide.....	296	1,201

Detroit.

CHARLES HEMROD & Co., dealers in Pig Iron, Detroit, Mich., report, under date of January 18, as follows: The quiet market which we mentioned in our letter of last week has continued in a normal condition ever since then, and now business is beginning to assume the character, so far as active demand is concerned, that would resemble August last, but this was anticipated. Naturally founders cannot get off their different lists of stocks and take their inventory till about this time, and we presume a more active demand will spring up during the course of the coming week, and we hope this is the beginning of a steady, healthy year for business. Prices remain as firm as ever. The Southern men are in a measure barred out on account of their freight rates being unsettled, and if they are put upon the basis originally talked of it

The Cleveland Rolling Mill Co. have made a contract with Gordon, Strobel and Lau, reau, providing that Mr. Gordon is to take supervision of their Central Furnace, with the understanding that he will reduce the consumption of fuel to the gross ton of iron below the net ton of coke, at the same time not diminishing the yield of the furnace below 200 tons a day, and improving the quality as steel making pig. These results are not expected to exceed the work of the North Chicago Rolling Mill furnaces, but to equal them. The Joliet Steel Furnace No. 2 has reached an economy of 2000 pounds to the gross ton of iron, and is making about 200 tons per day. No. 1 is being remodeled, and that furnace is expected to achieve like or better results.

L. COES'
GENUINE IMPROVED
Knife Handle
PATENT
Screw Wrenches
MANUFACTURED BY
L. COES & CO.,
Worcester, Mass.
ESTABLISHED IN 1839.




Patented July 6, 1880. Patented July 8, 1884.
Registered March 31, 1874.

Sectional view illustrates our NEW KNIFE HANDLE, showing Malleable Iron Frame and Shank of Bar keyed into position.
Straight Bar, Extra LONG NUT FOR SCREW IN JAW.

The Best Made and Strongest Wrench in the Market.
Send for Illustrated Price List and Circular.

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NEW YORK,
Sole Agents.

ILLINOIS IRON & BOLT CO.,

Nos. 20 to 26 Main Street,
CARPENTERSVILLE, KANE CO., ILL.,

MANUFACTURERS OF

BLACKSMITHS' TOOLS,



COMMON STEEL WACON SKEINS,

Jack Screws, Tire Benders, Track Jacks,
Carriage Makers' Vises,

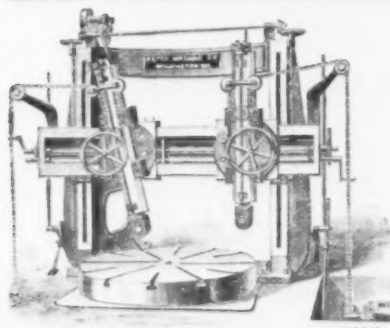
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For ordinary use our Common Steel Skeins will be found a superior article.

These Skeins are thoroughly welded and uniform, and only the best material is used in their manufacture.

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ESTABLISHED 1859 — BROCKTON, MASS.
The Only Manufacturers of a Complete Line of
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SEND FOR CIRCULAR. — UPRIGHT DRILLS.

BRASS AND IRON SHIP CHANDLERY HARDWARE.
Yacht Fixtures, Nickel-Plated Canoe Trimmings, Cheapest and Best Side Lights in the Market, Awning Hardware. Specialties in Brass made to Order.
THE SHELTON BRASS HARDWARE CO., Birmingham, Conn.
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Improved Machine Tools.

BORING AND TURNING MILLS

Of Modern Design and First-class Workmanship.
Sizes up to 14 feet Swing.

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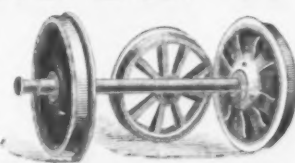
Manufacturers of

CHILLED WHEELS

OF ALL KINDS.

With or Without Axles.

KNOXVILLE, TENN.



THE CELEBRATED

Carter County

Cold Blast Charcoal Iron

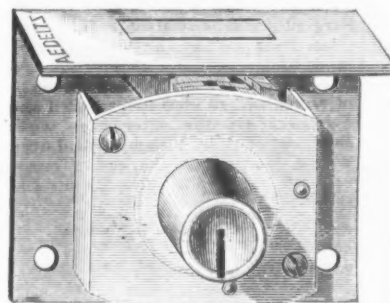
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THE WALKLEY HARDWARE CO., Plantsville, Conn.,
MANUFACTURERS OF

TACKS, BRADS, &c.

We call the attention of the Trade to our "Diamond" and "Circle" brand Steel Carpet Tacks. "Diamond" brand, Uniform Weights; "Circle" brand, Double Uniform Weights; 6, 8, 10, 12, 14, 16 ounce. "Diamond" brand, list. Blued, 17¢; Tinned, 30¢. "Circle" brand, list. Blued, 17¢; Tinned, 30¢. Warranted equal to Swedes in all essentials.

A. E. DEITZ.

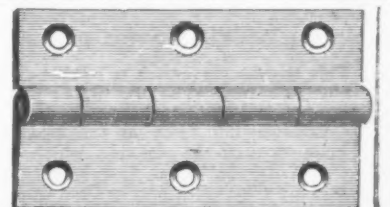


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97 Chambers and 81 Reade Sts.,

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ALWAYS GIVES THE
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Manufacturers of
**THE LEVIATHAN
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BELTING.

Unsurpassed for
Strength, Durability and
Cheapness.
Made to any Length,
Width and Strength.
Main Driving Belts.
Guaranteed to Run
Straight, Even Through-
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No Cross Joints, Un-
affected by Damp.
Clings well to the Pulley.
Has no equal. In fact,
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**BRYANT'S PATENT
EGG BEATERS.**

SIMPLE. PRACTICAL.
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Retails at 20 Cents Each.

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Philadelphia, Pa.

THE



After continual use in several of the leading mills in the country, we guarantee that our Rollers are in any and all respects equal to box-wood rollers—and we believe superior. We can furnish these Rollers at from 25 to 35% per cent. less in price than box-wood, and if you desire any of these Rollers we must have your orders now to be filled two months later. A sample set furnished by mail for 25¢. A superior quality of Sugar Wood bottoms also furnished at rock-bottom prices. Address
SPRINGFIELD MFG. CO.,
P. O. Box A. E. SPRINGFIELD, OHIO.

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FOR EASTERN MANUFACTURERS

IRON, STEEL, HARDWARE, &c.

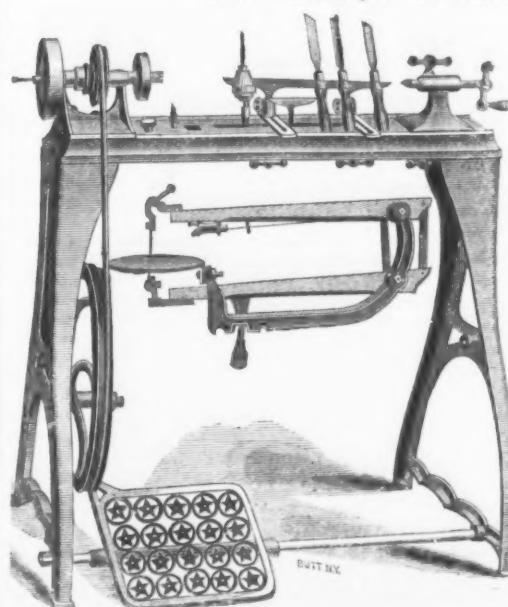
Correspondence solicited.

No. 309 California St. (Rooms 6 and 7), San Francisco, Cal.

WE HAVE ADDED THE

GOODELL LATHE AND SAW,

As seen in this Cut, to our Line of SCROLL SAW
SUPPLIES for the coming year.



It is by far the best Lathe in market. We have also made great improvements on the

Lester, Rogers and Cricket Saws.

Another generation of boys is coming to the front, so that the demand for these Saws is fast increasing, and seems likely to be as large as it was eight years ago. Dealers can increase their fall trade by laying in a stock.

Goodell Lathe and Tools ... \$10.00.
Scroll Saw Attach'm't, extra 2.00.
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Rogers Saw, No. 1 ... 3.50.
Cricket Saw, all Iron ... 2.50.
Bracket Sets, Nickel Plated, per doz ... 15.00.
Bracket Sets, Pleasure and Profit, per doz ... 10.00.

We are headquarters in New York for Wood, Designs and supplies of all kinds for bracket sawyers. Our Star Bracket Blades are superior to any others in use, and are in demand in many other countries.

There is a regular trade discount to all dealers.

MILLERS FALLS CO.,

74 CHAMBERS STREET, NEW YORK.

CHAMPLAIN
Forged Horse Nails.
MANUFACTURED BY THE
NATIONAL HORSE NAIL CO.,
Vergennes, Vermont.
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST
NORWAY IRON AND WARRANTED.
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97 CHAMBERS AND 81 READE STREETS NEW YORK.
DURRIE & McCARTY, Sole Agents.

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THE SEIDEL & HASTINGS CO.

WILMINGTON, DELAWARE,

New York Office, No. 221 Pearl, Corner Platt Street,
MANUFACTURERS OF

BEST CHARCOAL BOILER PLATES, AND PLATE IRON GENERALLY.

ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when desired. One hundred and sixteen tests of this iron, made during the last three years by the U. S. Inspectors of Steam Vessels, show an average tensile strength of 58,508 pounds to the sectional square inch, and an average reduction of area of the fractured section of 30% per centum. Our prices are as low as the production of a good article will admit of.



VARIETY IRON WORKS.

ALFRED C. REX & CO.,

Manufacturers of

PATENTED HARDWARE SPECIALTIES AND NOVELTIES.

MAIN OFFICE AND FACTORY

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BRANCH OFFICES:

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and 415 Commerce St., Phila.

New Spring Specialties—King Egg Beaters, awarded medal at American Institute, New York; King Candle Lamp and Lantern, cheapest combination ever made.

STRONGEST ACME WRENCH AND BEST.



ALL STEEL CASE-HARDENED JAWS. WARRANTED. MANUFACTURED BY
OWSLEY BROS. & MARBLE, 784 to 794 Madison St., CHICAGO, U. S. A.
Description and Price List Furnished upon Application.

PURE TURKISH EMERY.

WALPOLE EMERY MILLS,

South Walpole, Mass.

Hardware Novelties.

Wrought-Iron Buggy Toe Rail.

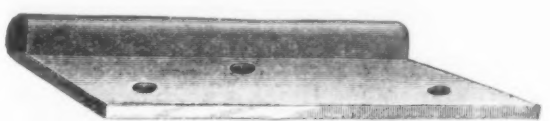
This article, the form of which is represented in the accompanying illustration, is made by the Cleveland Hardware Co., Cleveland, Ohio, and is described as made from a rolled blank, and, with the exception of the center foot, is one piece of iron. Making them in this way of wrought iron, the manufacturers are enabled to put them on the market at a price which they refer to as being as low as malleable and far below the price of drop forgings. They are made in sizes of from 18 to 34 inches, those from 30 to 34 inches having two center feet.



Wrought-Iron Buggy Toe Rail.

These toe rails are alluded to as very saleable, the manufacturers referring to their experience as being that, wherever goods in wrought iron can be furnished as cheap as malleable, the former are given the preference.

The Cleveland Hardware Co. are also making wrought-iron buggy rub irons, which are illustrated below. They are made 1 inch and 1 1/4 inches wide in flat part, the



Wrought-Iron Buggy Rub Iron.

stock length being 5 inches, the former size being intended for buggies, while the latter are for light spring wagons. The low prices at which these goods are sold are alluded to by the company.

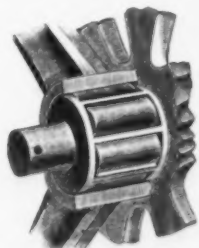
Moore's Anti-Friction Sash Pulleys.

The Moore Mfg. Co., 163 and 165 Lake street, Chicago, are putting on the market the sash pulleys named above and illustrated in the accompanying cuts, which clearly indicate their special features. With the anti-friction roller bushings, as shown, these



Moore's Anti-Friction Sash Pulley.

pulleys are described as noiseless, running smoothly and very durable. They are made in two sizes, 2-inch and 2 1/2-inch. The manufacturers make the point that these pulleys are sold at so reasonable a price that

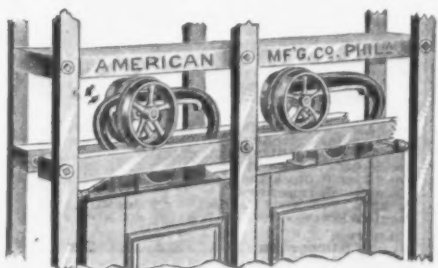


Anti-Friction Roller Bushing.

they should take the place of the common sash pulleys. They also suggest that in ordering the trade specify whether round or square grooves are wanted. If not otherwise specified, they will send round grooves.

Adjustable Anti-Friction Sliding Door Hanger.

The cut below illustrates the Adjustable Anti-Friction Sliding Door Hangers made by the American Mfg. Co., Philadelphia, for



Adjustable Anti-Friction Sliding Door Hanger.

whom the Lloyd & Supple Hardware Co., 625 Market street, Philadelphia, are agents. The door hangs from the top, as shown in the illustration, the rollers bearing on a hardwood rail. Along the entire base of the hanger or yoke runs a malleable-iron wedge which gives a bearing the full length. These wedges are provided with set-screws at their

smaller ends, by means of which they may be adjusted and the door raised in case it sags or settles. A special feature of these hangers, referred to by the manufacturers, is that the adjustment of the set-screws does not alter materially the position of the wedges, which continue to bear their entire length. The portion of the hanger on which the wheels run is milled to a true and even surface; the wheels are also carefully turned, so as to give a perfectly smooth motion. The hangers are adapted to doors of all weights, either single or double, and can be readily adjusted by means of the set-screws above mentioned. The American Mfg. Co. send out with their hangers full directions for putting them up, and, where instructions

are followed they say no difficulty will be experienced in adjusting them to the doors. The goods are described as carefully and accurately made, and are put on the market with confidence that their merits will be appreciated.

The Henry Four-Piece Sifter.

We illustrate below the Henry Four-Piece Sifter, which is manufactured by the Stra-

vinger Sifter Mfg. Co., La Fayette, Ind., under license from the J. M. Hunter Sifter Mfg. Co. A general view of the sifter is shown in Fig. 1. The sifter is made in four pieces, as indicated in Fig. 2. The measure is in two parts, hinged at the front, and has a spring catch below the handle which fastens them together when closed. The sieve, which has the form of a hemisphere, sets in the lower part of the sifter, and the agitator is placed immediately above it. The agitator is rotated by the handle shown in Fig. 1, and is supported by the spindle which passes through the further side of the

sifter. It will be seen that the sifter can readily be taken apart whenever desired. The manufacturers refer to this as the only one from which the sieve can be removed for cleaning and renewing, and it is this feature of it for which they claim special



Fig. 1.—General View of Sifter.

merit. New sieves can be had from the manufacturers whenever it becomes necessary to replace them. The uses to which this sifter can be put include mixer, meas-

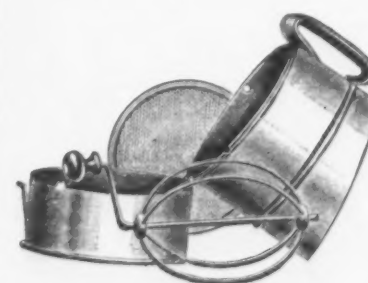


Fig. 2.—Sifter with Sieve and Agitator Removed.

urer, weigher, scoop, egg beater, rice washer, fruit strainer, &c. The officers of the Straubinger Mfg. Co. are E. W. Straubinger, president, and W. R. Patton, secretary.

The Forstner Auger-Bit.

This bit, a representation of which is given in the accompanying cut, is made by the Bridgeport Gun Implement Co., Bridgeport, Conn., and 17 Maiden lane, New York, and is intended for use where accurate, smooth and complicated work is necessary. It consists, as indicated by the cut, of a circular rim cutter provided with interior inclined knives placed on a higher plane than the rim cutter, so that the rim first penetrates and severs the grain of the wood at the circumference of the bore, thus leaving a core. Some important improvements in the shape and construction of the bit have been added since its manufacture was undertaken by this company, and it is in the improved form that it is now offered to the trade. When it was put on the market some few years ago it was not provided with side slots, which are a recent addition, on the value of which the manufacturers lay em-



The Forstner Auger-Bit Improved.

phasis, as when made without them it is referred to as not having worked satisfactorily. It is now being made with these and other improvements in workmanship, in the usual sizes, both for use in ordinary braces and in machines. The bits are sold separately or in sets, as may be required. The advantages to which the makers direct attention embrace the following: The bit will not deviate for knots or cracks; it will bore equally well with or against the grain; there is no liability of the wood splitting, however close the holes bored may be; the hole produced is true and polished; it may be used to render a hole already bored oblong, oval or square; it will enter the wood at any angle, from any direction, and is claimed to be the only round bit that will bore a square hole for letting in bolt heads. The general appearance of the tool is shown above.

INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

The Nashua Iron and Steel Co. have completed a 10-ton shaft for the steamboat Cambridge.

MASSACHUSETTS.

The old and popular firm of J. Stevens & Co., of Chicopee Falls, manufacturers of the celebrated Stevens firearms and fine machinists' tools, have sold out their business to the new corporation just formed under the name of the J. Stevens Arms and Tool Co., with the following officers: Joshua Stevens, president; William B. Fay, Joshua Stevens, George S. Taylor, directors; Irving H. Page, secretary; James E. Taylor, agent and treasurer. The above took possession of the business January 1st, 1886.

MAINE.

The New Process Twist Drill Co., of Portland, have been incorporated. Capital stock, \$60,000. Henry S. Hart and H. A. Cushman, Taunton, Me., incorporators.

At the Katahdin Iron Works, Bangor, an average product of about 20 tons of iron is made daily. Two new charcoal kilns are being built, so that the furnaces may be run to their full capacity.

VERMONT.

Within the past two months the Lincoln Iron Works, of Rutland, have put in their foundry two new coke cupolas. One of them is 26 inches inside diameter and the other 38 inches. During the past year they have added largely to their foundry, so that their capacity is nearly doubled.

RHODE ISLAND.

The Providence Steam Engine Co. are building engines for the following parties: Raymond & Comstock, South Norwalk, Conn., 50 horse-power; J. C. Graham, Philadelphia, 125 horse-power; and building and ready for shipment, Smith Granite Co., Westbrook, 50 horse-power; Peter Scheinn, Philadelphia, 175 horse-power; Hoyle, Harrison & Kaye, 125 horse-power; Owen Osborne, 50 horse-power; Arlington Mills, Lawrence, Mass., 300 horse-power; New England Co., Rockville, Conn., 125 horse-power.

CONNECTICUT.

The Southington Cutlery Co., Southington, have compromised with their striking grinders and finishers. The men have been on a strike for more than four weeks.

The wire-drawers' strike, which was begun six months ago at E. S. Wheeler & Co.'s East Haven mill, is ended. The strikers claim to have gained their point, while the firm say that both sides made concessions.

Forbes & Curtis, manufacturers of the Forbes patent die-stock, pipe cutting and threading machines, &c., Bridgeport, have just finished what is probably the largest die-stock ever turned out. It is intended to cut and thread 8-inch pipe. Its construction is such that one man can operate it. The stock was shipped to parties in Russia.

NEW YORK.

The New York Locomotive Works, in Rome, are building three heavy 10-wheel freight engines for the Rome, Watertown and Ogdensburg road.

C. E. Jennings & Co. have bought the entire plant of the Elmira Auger, Bit, Drawing Knife and Tool Factory, and will start up work February 1 with 60 hands. The factory has been idle 14 months. The auger branch of the factory is one of the very few manufacturing of the kind in the country.

The Ashcroft Mfg. Co., of 111 Liberty street, announce, under date of the 16th inst., that they have secured the services of Mr. George E. Ewing, formerly connected with the Buckeye Iron and Brass Works,

Mr. Ewing is a gentleman of large experience and is favorably known among the trade.

NEW JERSEY.

The Phoenix Iron and Machine Co., of Trenton, are busy on orders for their new Trenton engines. At the recent Novelty Exhibition in Philadelphia they were awarded a silver medal for this engine, but the matter was referred back to the committee, and they expect to receive the highest award. They are also at work on the structural iron for the United States post office at Syracuse, N. Y., for which they received the contract, amounting to \$10,750. During the coming summer or fall they will put up some new buildings, as their present accommodations are too limited.

PENNSYLVANIA.

On the 1st of January the Bellefonte Iron and Nail Co., Limited, of Bellefonte, began the manufacture of steel nails under the Bernard Lauth patent for rolling nail plate from steel rails and crop ends. The patent is owned by the company, but the intention is to introduce the process into a limited number of other mills. There is also talk of turning the Bellefonte Car Works into a shovel and tack works early this year to use steel made under this patent.

A contract for 16 locomotives has been let by the Chicago and Indiana Coal Railway Co. to the Baldwin Works, Philadelphia, of which six are Consolidated Mogul, four Mogul, two passenger and four switch.

Preparations are being made for the starting of the large furnaces at Riddlesburg lately owned by the Kemble Coal and Iron Co., and which have been out of blast for more than a year on account of the failure of the company. The fires will be lighted in a few days. The new proprietors are Nimick & Co., of Pittsburgh, and a few other persons, the latter holding a small proportion of the stock.

The following officers have been elected by the Columbia Iron and Steel Co., whose buildings are now in course of erection at Uniontown: President, C. Yeager; treasurer, E. M. Butts.

An entirely new furnace, with the best approved improvements, has been erected on the site of the old No. 1 North Lebanon Furnace, in the Lower Susquehanna Valley, belonging to the G. Dawson Coleman estate. The erection was begun in May, and the furnace was very successfully blown in on the 4th inst., and has worked well.

At R. B. Seidel's Black Lead Crucible Works, in Philadelphia, is a crucible returned to them from Diston's new works, which has just passed through 13 successive heats. When it is considered that six is the guaranteed number of heats, the above is so remarkable that the Messrs. Diston have ordered the crucible put in a glass case, with its record marked upon it.

The Pennsylvania Folding Iron and Gate Co., at Harrisburg, have elected the following officers: President, W. J. Calder; vice-president, W. T. Hildrup, Jr.; treasurer, G. M. McCauley; secretary, D. Fleming, Jr.; directors, J. A. Bostwick, Robert Snodgrass, W. J. Calder, G. G. Boyer, W. T. Hildrup, Jr.

The Warwick Iron Co., at Pottstown, elected these officers: President, Isaac Fegley; secretary, Vincent P. McCully; treasurer, Jacob Fegley; managers, Isaac Fegley, George Gelbach, Philip Doerr, Peter Schemm, Jacob Rech, Charles Burlinger, Vincent P. McCully; superintendent, Edgar S. Cook.

No. 3 Furnace of the Pennsylvania Steel Co., at Steelton, blew out on Saturday, the 9th inst. Repairs will be made as rapidly as possible, and some valuable improvements will be made before relighting the fires.

No. 3 Furnace of the Thomas Iron Works, at Hokendauqua, was again lighted last week, making five furnaces in blast at that place.

The Stenton Car Works, at Catasauqua, which have been idle for some time, have received an order from the Bethlehem Iron Co. for 100 ore cars. The necessary repairs are being made about the shop, and work will begin as soon as possible.

The Harrisburg Foundry and Machine Works have received an order from Lexington, Ky., for a 15-ton roller.

The entire indebtedness of the Wheeler Iron Co., at Sharon, which failed last summer, has been paid in full.

PITTSBURGH AND VICINITY.

The new nail mill of Chess, Cook & Co., near Bradock, was completed last week.

The Pittsburgh Tube Co., composed of George F. McCleane, M. K. Moorhead and James McCutcheon, of Pittsburgh, and J. H. Lindsay, Joseph McCutcheon and Nathan McDowell, of Allegheny City, for which a charter was granted a few days ago, have purchased the equipment of the pipe department of the extensive manufacturing establishment of Crane Bros., in Chicago, and will move the machinery to Pittsburgh immediately. The purchase will enable the Tube Co. to complete their establishment in a comparatively short time.

The Charlotte Furnace, at Scottdale, has started up. It is the first time it has been running since last February.

The shovel works of H. M. Myers & Co., at Beaver Falls, are now running double turn in every department and have orders enough on their books to keep them running in that manner until July.

At the annual meeting of the Volta Iron Co., Limited, last week, the following officers were elected for the ensuing year: George G. McMurtry, chairman; Otis H. Childs, secretary; W. F. Bache, treasurer, and J. J. Vandergrift, Jr., George G. McMurtry, Otis H. Childs, managers. It will be seen from the above that Mr. P. H. Laufmann has retired from the management of the works. He still retains his \$40,000 worth of stock.

The Beaver Falls Car Works, at Beaver Falls, were totally destroyed by fire on the

morning of the 15th inst. The works were built in 1877 and were owned principally by the Economite Society. They place their loss at about \$15,000, but it is thought it will reach much more, as all their valuable patterns are destroyed and the fine machinery is almost a total loss. At present the works were employing only about 25 men. They will hardly be rebuilt.

The new pipe works at Scottdale made their first casting this week.

The repairs at the sheet mill of the Beaver Falls Iron Co., formerly McKee, Anderson & Co., are completed and the mill will resume operations in a few days. Natural gas as a fuel has been introduced in the above mill.

OHIO.

Last Monday the assignees of George Summers, Sr., former proprietor of the Russia Mill, at Niles, paid 45 per cent. of the wages due the employees at the time of the failure of Mr. Summers, some months ago. It is believed that all labor claims will be paid in full.

The Wheeling Creek Co. and the Maynard Coal Co., at Martin's Ferry, have advanced the miners' wages from 50 cents to 60 cents per ton.

The Walker Mfg. Co., of Cleveland, have increased their capital stock from \$125,000 to \$200,000.

INDIANA.

The Dean Bros. Steam Pump Works, of Indianapolis, have recently added a brass foundry to their works. They have also secured the contract for the new pumping engine for the water works at Charleston, Ill.

ILLINOIS.

The Williams Engine Co., of Chicago, have been incorporated. Capital stock, \$50,000. A. C. Sheldon, Charles H. Mitchell, 78 Dearborn street, and Edwin F. Williams, incorporators.

The Union Brass Mfg. Co., of Chicago, have booked a contract for the brass fittings, elevator fronts and elevator inclosures for the Topeka, Kan., courthouse. A new department for the manufacture of architectural and decorative brasswork of all kinds has been added to the plant.

The Crane Elevator Co., Chicago, were organized on the 12th inst. and the following officers elected: R. T. Crane, president; C. R. Crane, vice-president; W. W. Wells, secretary; H. B. Crane, treasurer. The works have just been erected, and hydraulic, steam and passenger elevators will be manufactured. Three hundred and eighty men are now employed.

During the past year the American Cutlery Co., of Chicago, have added some \$20,000 worth of machinery to their outfit, and have purchased 50 x 125 feet of ground adjoining the east end of their works for the purpose of enlarging their facilities. A silver and nickel plating department has been opened in connection with the other branches of their business.

MISSOURI.

The Western Steel Co., of St. Louis, are making extensive improvements in the steel-rail department, preparatory to restarting the same. They expect to be making rails in a few weeks.

The Midland Blast Furnace Co., whose plant is in Crawford County, this State, made 13,682 tons of pig iron last year.

VIRGINIA.

The blast furnace of the Crozer Steel and Iron Co., at Roanoke, commenced its present blast June 1, 1885; during July it was stopped 11 days to put in new steam-valve gear and air-valves in its engines. Its output, in pig-iron tons, from June 1, 1885, to January 1, 1886, was:

	Tons.
Foundry pig iron	13,601
Force pig iron	5,465
Mottled pig iron	33
White pig iron	6
Total output	19,075

This shows an average daily output of about 96 tons, nearly all of it the higher grades of pig iron.

Low Moor Furnace, of the Low Moor Iron Co., of Va., made the following quantities, by kinds, in 2,300 pounds, or furnace, tons of pig iron, during the calendar year 1885, from January 1 to December 31, inclusive:

	Tons.
No. 1 foundry iron	17,082
No. 2 foundry iron	18,462
Mill iron	6,239
Silvery iron	742
Mottled iron	437
White iron	17
Total output	43,040

—Industrial South.

WEST VIRGINIA.

The report that the Laughlin Nail Co., of Wheeling, could not start their plate mill on account of the refusal of Humphrey Williams to take charge is without foundation. The mill resumed operations on Wednesday, the 13th inst. The above company have 92 nail machines in operation, and turned out 4,900 kegs of steel nails week before last.

ALABAMA.

The Pennsylvania men who have been prospecting at Birmingham, with a view to planting co-operative stove works there, have perfected their plans and their buildings will be erected at once.

Messrs. Cartie & Haynie, from Georgia, have arranged to plant a saw mill and furniture factory at Childersburg.

The directors of the Sheffield Land, Iron and Coal Co. have organized a project to build a \$100,000 furnace at Sheffield, and a good part of the stock has been subscribed.

Some Montgomery men have bought 4000 acres of coal land in Walker County, and purpose stocking a company at \$100,000 to develop the property.

The discovery of an extensive deposit of iron ore near Isbell, Franklin County, is reported.

WHOLESALE METAL PRICES, January 20, 1886.

METALS.

IRON.—Duty: Bars, 8-10¢ to 11-10¢ per lb.; provided that no bar iron shall pay a less rate of duty than 35¢. Sheet, 11-10¢ to 15-10¢ per lb. Band, Hoop and Scrolled, 16 to 17-10¢ per lb. Railroad Bars weighing more than 25 lb. per yard, 7-10¢ to 10¢ per lb.

Standard American Pig Iron.
Foundry No. 1, X..... 10.50 @ 18.50
Foundry No. 2, X..... 10.00 @ 17.50
Gray Forge..... 10.00 @ 16.50

No. 1 Scotch Pig Iron.
Carbone..... 20.50 @ 21.00
Colts..... 20.50 @ 21.00
Shotts..... 20.50 @ 21.00
Glenbrook..... 20.50 @ 21.00
Glenbrook..... 20.50 @ 21.00
Langdon..... 20.50 @ 21.00
Summerlee..... 20.50 @ 21.00
Balmellington..... 20.50 @ 21.00
Edginton..... 20.50 @ 21.00
Clyde..... 20.50 @ 21.00

Steel. At Eastern mills..... 20.50 @ 21.00
Old Rails, Tm..... 20.50 @ 21.00

Wrought. 20.50 @ 21.00
Bar Iron from Store..... 20.50 @ 21.00

Common Iron:
1 to 1 in. round and square..... 1.75 @ 1.80
Refined Iron..... 1.75 @ 1.80

3/4 to 2 in. round and square..... 1.90 @ 2.00
1 to 6 in. x 1/4 to 1 in..... 1.95 @ 2.00
1 to 6 in. x 1/2 to 1 in..... 1.95 @ 2.00
Rods—3/4 and 1-1/2 round and square..... 1.80 @ 1.90
Bands—1 to 6-1/2 to No. 12..... 2.00 @ 2.10
Burden's "Best" Iron, base price..... 2.00 @ 2.10
Burden's "H. B. & S." Iron, base price..... 2.00 @ 2.10
Norway Nail Rods..... 5 @ 6¢

Sheet Iron from Store. Common..... 20.50 @ 21.00
R. G. American..... 20.50 @ 21.00
Nos. 10 to 16..... 20.50 @ 21.00
17 to 20..... 20.50 @ 21.00
21 to 24..... 20.50 @ 21.00
25 to 30..... 20.50 @ 21.00
31 to 36..... 20.50 @ 21.00
37 to 42..... 20.50 @ 21.00
43 to 48..... 20.50 @ 21.00
49 to 54..... 20.50 @ 21.00
55 to 60..... 20.50 @ 21.00
61 to 66..... 20.50 @ 21.00
67 to 72..... 20.50 @ 21.00
73 to 78..... 20.50 @ 21.00
79 to 84..... 20.50 @ 21.00
85 to 90..... 20.50 @ 21.00
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163 to 168..... 20.50 @ 21.00
169 to 174..... 20.50 @ 21.00
175 to 180..... 20.50 @ 21.00
181 to 186..... 20.50 @ 21.00
187 to 192..... 20.50 @ 21.00
193 to 198..... 20.50 @ 21.00
199 to 204..... 20.50 @ 21.00
205 to 210..... 20.50 @ 21.00
211 to 216..... 20.50 @ 21.00
217 to 222..... 20.50 @ 21.00
223 to 228..... 20.50 @ 21.00
229 to 234..... 20.50 @ 21.00
235 to 240..... 20.50 @ 21.00
241 to 246..... 20.50 @ 21.00
247 to 252..... 20.50 @ 21.00
253 to 258..... 20.50 @ 21.00
259 to 264..... 20.50 @ 21.00
265 to 270..... 20.50 @ 21.00
271 to 276..... 20.50 @ 21.00
277 to 282..... 20.50 @ 21.00
283 to 288..... 20.50 @ 21.00
289 to 294..... 20.50 @ 21.00
295 to 300..... 20.50 @ 21.00
301 to 306..... 20.50 @ 21.00
307 to 312..... 20.50 @ 21.00
313 to 318..... 20.50 @ 21.00
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337 to 342..... 20.50 @ 21.00
343 to 348..... 20.50 @ 21.00
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409 to 414..... 20.50 @ 21.00
415 to 420..... 20.50 @ 21.00
421 to 426..... 20.50 @ 21.00
427 to 432..... 20.50 @ 21.00
433 to 438..... 20.50 @ 21.00
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457 to 462..... 20.50 @ 21.00
463 to 468..... 20.50 @ 21.00
469 to 474..... 20.50 @ 21.00
475 to 480..... 20.50 @ 21.00
481 to 486..... 20.50 @ 21.00
487 to 492..... 20.50 @ 21.00
493 to 498..... 20.50 @ 21.00
499 to 504..... 20.50 @ 21.00
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517 to 522..... 20.50 @ 21.00
523 to 528..... 20.50 @ 21.00
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541 to 546..... 20.50 @ 21.00
547 to 552..... 20.50 @ 21.00
553 to 558..... 20.50 @ 21.00
559 to 564..... 20.50 @ 21.00
565 to 570..... 20.50 @ 21.00
571 to 576..... 20.50 @ 21.00
577 to 582..... 20.50 @ 21.00
583 to 588..... 20.50 @ 21.00
589 to 594..... 20.50 @ 21.00
595 to 600..... 20.50 @ 21.00
601 to 606..... 20.50 @ 21.00
607 to 612..... 20.50 @ 21.00
613 to 618..... 20.50 @ 21.00
619 to 624..... 20.50 @ 21.00
625 to 630..... 20.50 @ 21.00
631 to 636..... 20.50 @ 21.00
637 to 642..... 20.50 @ 21.00
643 to 648..... 20.50 @ 21.00
649 to 654..... 20.50 @ 21.00
655 to 660..... 20.50 @ 21.00
661 to 666..... 20.50 @ 21.00
667 to 672..... 20.50 @ 21.00
673 to 678..... 20.50 @ 21.00
679 to 684..... 20.50 @ 21.00
685 to 690..... 20.50 @ 21.00
691 to 696..... 20.50 @ 21.00
697 to 702..... 20.50 @ 21.00
703 to 708..... 20.50 @ 21.00
709 to 714..... 20.50 @ 21.00
715 to 720..... 20.50 @ 21.00
721 to 726..... 20.50 @ 21.00
727 to 732..... 20.50 @ 21.00
733 to 738..... 20.50 @ 21.00
739 to 744..... 20.50 @ 21.00
745 to 750..... 20.50 @ 21.00
751 to 756..... 20.50 @ 21.00
757 to 762..... 20.50 @ 21.00
763 to 768..... 20.50 @ 21.00
769 to 774..... 20.50 @ 21.00
775 to 780..... 20.50 @ 21.00
781 to 786..... 20.50 @ 21.00
787 to 792..... 20.50 @ 21.00
793 to 798..... 20.50 @ 21.00
799 to 804..... 20.50 @ 21.00
805 to 810..... 20.50 @ 21.00
811 to 816..... 20.50 @ 21.00
817 to 822..... 20.50 @ 21.00
823 to 828..... 20.50 @ 21.00
829 to 834..... 20.50 @ 21.00
835 to 840..... 20.50 @ 21.00
841 to 846..... 20.50 @ 21.00
847 to 852..... 20.50 @ 21.00
853 to 858..... 20.50 @ 21.00
859 to 864..... 20.50 @ 21.00
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871 to 876..... 20.50 @ 21.00
877 to 882..... 20.50 @ 21.00
883 to 888..... 20.50 @ 21.00
889 to 894..... 20.50 @ 21.00
895 to 900..... 20.50 @ 21.00
901 to 906..... 20.50 @ 21.00
907 to 912..... 20.50 @ 21.00
913 to 918..... 20.50 @ 21.00
919 to 924..... 20.50 @ 21.00
925 to 930..... 20.50 @ 21.00
931 to 936..... 20.50 @ 21.00
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991 to 996..... 20.50 @ 21.00
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1003 to 1008..... 20.50 @ 21.00
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1015 to 1020..... 20.50 @ 21.00
1021 to 1026..... 20.50 @ 21.00
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1837 to 1842..... 20.50 @ 21.00
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1873 to 1878..... 20.50 @ 21.00
1879 to 1884..... 20.50 @ 21.00
1885 to 1890..... 20.50 @ 21.00
1891 to 1896..... 20.50 @ 21.00
1897 to 1902..... 20.50 @ 21.00
1903 to 1908..... 20.50 @ 21.00
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1963 to 1968..... 20.50 @ 21.00
1969 to 1974..... 20.50 @ 21.00
1975 to 1980..... 20.50 @ 21.00
1981 to 1986..... 20.50 @ 21.00
1987 to 1992..... 20.50 @ 21.00
1993 to 1998..... 20.50 @ 21.00
1999 to 2004..... 20.50 @ 21.00
2005 to 2010..... 20.50 @ 21.00
2011 to 2016..... 20.50 @ 21.00
2017 to 2022..... 20.50 @ 21.00
2023 to 2028..... 20.50 @ 21.00
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2083 to 2088..... 20.50 @ 21.00
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2101 to 2106..... 20.50 @ 21.00
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2113 to 2118..... 20.50 @ 21.00
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2137 to 2142..... 20.50 @ 21.00
2143 to 2148..... 20.50 @ 21.00
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2155 to 2160..... 20.50 @ 21.00
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2227 to 2232..... 20.50 @ 21.00
2233 to 2238..... 20.50 @ 21.00
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2257 to 2262..... 20.50 @ 21.00
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2281 to 2286..... 20.50 @ 21.00
2287 to 2292..... 20.50 @ 21.00
2293 to 2298..... 20.50 @ 21.00
2299 to 2304..... 20.50 @ 21.00
2305 to 2310..... 20.50 @ 21.00
2311 to 2316..... 20.50 @ 21.00
2317 to 2322..... 20.50 @ 21.00
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2329 to 2334..... 20.50 @ 21.00
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2341 to 2346..... 20.50 @ 21.00
2347 to 2352..... 20.50 @ 21.00
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2377 to 2382..... 20.50 @ 21.00
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2389 to 2394..... 20.50 @ 21.00
2395 to 2400..... 20.50 @ 21.00
2401 to 2406..... 20.50 @ 21.00
2407 to 2412..... 20.50 @ 21.00
2413 to 2418..... 20.50 @ 21.00
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2425 to 2430..... 20.50 @ 21.00
2431 to 2436..... 20.50 @ 21.00
2437 to 2442..... 20.50 @ 21.00
2443 to 2448..... 20.50 @ 21.00
2449 to 2454..... 20.50 @ 21.00
2455 to 2460..... 20.50 @ 21.00
2461 to 2466..... 20.50 @ 21.00
2467 to 2472..... 20.50 @ 21.00
2473 to 2478..... 20.50 @ 21.00
2479 to 2484..... 20.50 @ 21.00
2485 to 2490..... 20.50 @ 21.00
2491 to 2496..... 20.50 @ 21.00
2497 to 2502..... 20.50 @ 21.00
2503 to 2508..... 20.50 @ 21.00
2509 to 2514..... 20.50 @ 21.00
2515 to 2520..... 20.50 @ 21.00
2521 to 2526..... 20.50 @ 21.00
2527 to 2532..... 20.50 @ 21.00
2533 to 2538..... 20.50 @ 21.00
2539 to 2544..... 20.50 @ 21.00
2545 to 2550..... 20.50 @ 21.00
2551 to 2556..... 20.50 @ 21.00
2557 to 2562..... 20.50 @ 21.00
2563 to 2568..... 20.50 @ 21.00
2569 to 2574..... 20.50 @ 21.00
2575 to 2580..... 20.50 @ 21.00
2581 to 2586..... 20.50 @ 21.00
2587 to 2592..... 20.50 @ 21.00
2593 to 2598..... 20.50 @ 21.00
2599 to 2604..... 20.50 @ 21.00
2605 to 2610..... 20.50 @ 21.00
2611 to 2616..... 20.50 @ 21.00
2617 to 2622..... 20.50 @ 21.00
2623 to 2628..... 20.50 @ 21.00
2629 to 2634..... 20.50 @ 21.00
2635 to 2640..... 20.50 @ 21.00
2641 to 2646..... 20.50 @ 21.00
2647 to 2652..... 20.50 @ 21.00
2653 to 2658..... 20.50 @ 21.00

THE WEEK.

Captain Babson, lately collector of Gloucester, who is now in Washington as a representative of the American Fishery Union, is opposed to a renewal of the arrangement with British America which expired in July. He says: "The Gulf of St. Lawrence, into which we formerly sent some 600 vessels, is now frequented by very few American vessels, and the mackerel, by the extensive use of seines, have been frightened, their course northward broken up, and our vessels take almost their entire fares in the open ocean. The idea that all our fish were got in British waters is widely prevalent, but a single glance at a map and at the location of the fishing grounds or banks on the inner edge of the Gulf Stream is enough to dispel that illusion. The fishing banks used by our people are not within the national jurisdiction of any country."

M. De Lesseps starts for Panama January 27, accompanied by 15 delegates from France, Germany, Holland and the United States, and promises confidently that the canal will be finished in 1888.

Theo. Moss, the Underground Wire Commissioner, says the system to be adopted will be decided upon within two or three weeks, but speaks of many difficulties. It is a question whether it is best to lay the electric-light wires in the same conduits with the telephone and telegraph wires. Large iron pipes do not seem to be just the thing for streets where steam-heating mains are laid. To build large vaulted conduits like those in Paris would cost too much.

An English company has been formed with a large capital for the regular consignment of frozen meat from the Falkland Islands to England, and a special agent appointed, who has entered into contracts for supplying 60,000 sheep for exportation annually for five years.

American imports of manufactured cotton, wool and silk decreased last year to the extent of \$13,000,000, partly as a result of business depression and partly on account of home production. New York City still holds its position as the central market.

Nearly 3,000,000 tons of ice will be harvested this year on the Upper Hudson.

J. A. Roberts, civil engineer, of New York, after an experience of three years on the Pacific Slope, volunteers a good word for the Chinese laborer. He says they are the best foreigners on the Pacific side of the continent; that they are "peaceable, frugal and industrious, take good care of their own sick and disabled, and don't become politicians as soon as they land. They make better laborers and more trusty than the hoodlum element which is persecuting them."

The estimated capital in the lumber trade of Chicago is about \$18,000,000, and the value of products handled annually approaches \$40,000,000. The aggregate of profits for the past year possibly reaches 10 per cent. on the investment. The receipts from January 1 to December 30, inclusive, were:

	Receipts	Shingles
1885	1,744,620,000	765,427,000
1884	1,821,505,000	878,950,000
Decrease	76,885,000	113,523,000

The aggregate value of forest products received during the year was about \$40,000,000. The shipments for the year were 1,650,000,000 feet of lumber and 666,000,000 shingles—a decrease for the season of 139,000,000 feet of lumber and 317,000,000 shingles, as compared with 1884. Receipts by Lake for the season have borne prices about \$1 per M higher than those of 1884, the yard prices being in about the same ratio. Present indications point to an immediate improvement. The receipts of sawed lumber at the Albany lumber district by canal for the year just closed were 467,000,000 feet. This amount has been exceeded but three times in the last 15 years.

The New York Historical Society propose to erect a fire-proof building to cost \$300,000, and \$100,000 has been conditionally pledged toward this object.

Wire fences are charged with being the indirect cause of the destruction by freezing of many cattle on the Western prairies by checking their progress while seeking shelter in ravines or thickets.

The consul of the United States at Santiago de Cuba reports the existence of large quantities of bat guano on the south coast of the island of Cuba, estimated at 25,000 to 30,000 tons.

The London and Northwestern Railway Co. have decided to substitute metal sleepers for the present wooden ones throughout their system. This change will give an impetus to the iron trade. Other railways will follow the Northwestern's example.

The three Governments of Guatemala, Honduras and Salvador, representing four-fifths of the wealth and population of Central America, have entered into an alliance which is supposed to be the first step toward the consolidation of the five Central American Republics which President Barrios, of Guatemala, attempted to accomplish by force last spring.

American manufacturers of window glass are much disturbed by reports that Belgian manufacturers are endeavoring to enforce a reduction of wages to meet the 10 per cent.

reduction accepted a few months ago by the American workmen. The latter reduction was designed to enable the home manufacturers to compete successfully with the foreign importers, and it has, according to the Treasury returns, caused a decrease of nearly one half compared with 1884.

A calculation of the cost of pumping natural gas long distances with pumping stations, say, at every 50 miles along the route is unfavorable, both from a mechanical and financial point of view, to the project of supplying New York and Philadelphia from the Pennsylvania oil region. A Pittsburgh editor says: "The best knowledge of natural gas and the largest experience with it teach that, owing to specific gravity and friction, it loses 6 pounds of its pressure for every mile it travels from the well. Assume that the pressure at the well is 200 pounds. Losing 6 pounds at every mile, it will become inert at a distance of 33 1/3 miles, or say at 50 miles. At that point the pump must be brought into service, and as soon as it is the gas begins to pack, and pumping it would not be unlike forcing snow through a long tube. The only way to remedy this difficulty would be to establish pumping stations at short distances, so as to prevent this packing. Assuming that the mechanical difficulty may be overcome, there remains the financial. The cost of pumping stations would add largely to the investment for pipes. Will it be possible to conduct the gas to Philadelphia and New York at a profit on so large a capital?"

The public debt of the American Union in 1791 was \$75,000,000. At the breaking out of the war of 1812 it was \$45,000,000. It was increased in that struggle to \$170,000,000. In 1816 this debt was gradually reduced until in 1835 it was only \$37,000. This was the lowest point in our whole history. It increased to \$10,000,000 in 1838, was reduced to \$3,000,000 in 1839, and varied from that point to \$64,000,000, at which figure it stood when the late war broke out. It then went up to \$2,700,000,000 in 1866, and is now less than \$1,800,000,000.

Of all the voyages made during the year in the Transatlantic trade, that of the Cunard steamship *Etruria* ranks first, the time made between Queenstown and New York, 6 days, 5 hours and 44 minutes, being the fastest voyage ever accomplished. Among the other lines many remarkable passages were made, the trip from Havre to New York, made in 7 days, 21 hours, by the General Transatlantic Co.'s steamer *Normandie*, being the best on record. The fleet of the North German Lloyd also made many noteworthy passages.

Maine's shipbuilding interests, according to the *Boston Journal*, suffered considerably last year. The amount of net tonnage built in Maine yards has decreased from 46,401 tons in 1884 to 23,053 tons in 1885. There has also been a great change in the character of vessels built, the majority being 100 tons and designed for coasting trade, instead of from 500 to 800 tons, as in former years. The vessels built during 1885 were: 1 bark, 3 barkentines, 38 schooners, 5 sloops, 5 ships and 5 steamers—total, 57. The outlook for this year is reported to be not more encouraging than a year ago.

The plans and specifications for the enlargement of the Welland Canal, so as to admit of vessels drawing 14 feet of water, have been prepared and are now on exhibition at the chief engineer's office in Ottawa.

The office of Assistant United States Treasurer in New York is no sinecure. It is said that he signs his name on an average 1000 times a day. On Mondays and Saturdays, which are known as Clearing-House days, the number runs above this, while at the beginning of each quarter of the year it takes a whole week to get rid of the interest checks that have to be paid out to the millionaire bondholders.

A platinum wire too fine to be seen with the naked eye is said to have been made by Mr. H. T. Read of Brooklyn. It is to be used in telescopes as a substitute for the spider's web usually employed.

The New York Tax Commissioners have completed their tables of the assessed valuation of real estate for 1886. They fix the total at \$1,206,112,404, which is an increase of \$37,669,267 over last year. The greatest increase was in the upper wards.

A telegram from the City of Mexico, says: "Money is plentiful, owing to the fact that merchants are not remitting to the United States and Europe. They are holding back, hoping for a rise in silver." Meanwhile business is prostrated.

Near Riverside, San Bernardino County, Cal., an enterprising farmer is irrigating land by steam-power, lifting the water through pumps to a height of 262 feet. The cost is \$1 per inch for 24 hours. His pumping works, it is estimated, will irrigate 40 acres, if in continuous operation, on a basis of 1 inch to 5 acres.

The chief of the Bureau of Statistics furnishes a statement of the quantities and values of the imports into the United States from Mexico, and the exports to Mexico from the United States, during each of the years from 1860 to 1885 inclusive, for the information of Congress. The total imports from Mexico in 1860 were \$1,903,431. They were least in 1862, viz., \$730,958, and great-

est in 1885, viz., \$9,267,021. Our exports to Mexico in 1860 were \$5,324,013. The least amount was \$2,181,174 in 1862, and greatest in 1883, when they reached the value of \$16,587,620. They approximated this amount in 1865, when they were reported at \$16,350,839. In 1885 the exports of merchandise to Mexico were \$8,340,784. In the opinion of Congressman Morrison, the Mexican treaty is the only one proposed by which the United States does not lose more than it gains. The Hawaiian treaty, in his judgment, has never been beneficial to the United States, and should be repealed without delay.

In 8000 manufacturing establishments in New Jersey, according to the report of the State factory inspector, there are nearly 15,000 children growing up in ignorance.

Senator Beck, though friendly to a free-ship bill, is not hopeful of such a measure becoming a law. He says the opposition comes mainly from those interests which control the coastwise trade. The latter would not willingly invite the competition of foreign bottoms.

A ship has just come round the Horn with a cargo of 225 masts from Puget Sound, each of which is nearly 100 feet in length. These are of the Douglas fir, or "Oregon pine" (*Pseudotsuga*), and found a ready sale among Eastern shipbuilders.

The imports of paper stock at New York in 1885 amounted to 330,169 bales, which is a decrease of 10,384 bales compared with 1884. Prices were lower than ever before, of which paper manufacturers had the advantage.

Fourteen firms of the United Cigar Manufacturers' Association in this city came to the assistance of two of their number whose workmen had struck, by ordering a lockout in all the factories, which together employ 7000 hands. The manufacturers hope the lockout will compel the cigar-makers to accept the new schedule of prices issued on January 1, which the men claim involves a reduction of from \$1 to \$2.50 per 1000.

The Keystone Bridge Co., of Pittsburgh, have just received large orders for several new steel and iron railroad bridges. One order is for 13 spans, each averaging 200 feet in length, for the East Tennessee and Georgia Railroad. Several of the large orders are for bridges for Western railroads. The orders came just as the company began work on a bridge ordered by the Baltimore and Ohio Co. to cross the Schuylkill at Philadelphia. This bridge will contain one span 515 feet long; will also contain over 1,500,000 pounds of steel, will be the first double-track steel bridge ever built in the country, and will be finished by September 1. The company will make the last shipments in a few days of the Baltimore and Ohio single-track all-steel bridge to be erected at Havre-de-Grace. This bridge contains two spans 376 feet long, four 475 feet long, and two spans 515 feet long. There are also 1400 feet of steel trestle-work approaches for this bridge. The company are also working on three spans of bridge for the Pennsylvania and Schuylkill Valley Railroad. This bridge will have 48 plate girders, each 84 feet long and 9 feet high, and each girder weighing over 30,000 pounds.

The trade of New Orleans is being steadily diverted to Atlantic seaports by the intermediate railway lines, notwithstanding the large amounts expended in improving the Mississippi River. The official statement of the Board of Trade shows that cotton can be shipped now from almost any interior point on a through bill of lading to Liverpool by way of New York. Last year \$40,000,000 worth of unmanufactured cotton was exported from New York. Before the war New Orleans shipped 70 per cent. of the entire cotton crop; now it does not ship more than 26 per cent. of the crop. She then imported about 80 per cent. of the coffee that came to this country; now she imports less than 7 per cent. of it, not much more than San Francisco and considerably less than Baltimore. Galveston is taking her Mexican trade, while St. Louis, Memphis, Montgomery, Atlanta and her more enterprising neighbors to the north and east are diverting her wholesale trade. To fortify their positions local merchants seek to extend their trade with Central and South America.

Correspondence from Lima, dated December 25, speaks of the situation in Peru as hopeful. There is more confidence in business circles, all of the ports are open, and communications with the interior are uninterrupted. Now is the time, says the writer, for developing immense wealth now lying dormant.

How the trade relations of the United States and China are liable to be affected by the harsh treatment of Chinese emigrants in California and Wyoming is the subject of remark by one of our Wall street contemporaries, who says: "It is not straining a point to affirm that the open or secret encouragement which the California authorities may give to the hoodlums has the effect more than ever of making England seem to the Chinese not only their best friend, but their only one. We must not be surprised at any moment to hear that under these favorable conditions English trade has received a powerful impulse by the annexation of Burmah, which will make China the virtual frontier of India. And it is now almost certain that English manufacturers

will get all the contracts for rails, locomotives and cars required for the new roads projected in the Empire. Much of this profitable business would fall to the share of America but for the brutal treatment of the Chinese in this country."

Mr. F. H. Winston, United States minister to Persia, who has just left for his post, expects to work up a brisk trade with this country in small arms. An agent of the Winchester Arms Co. will follow in a few days.

The Secretary of the Treasury asks appropriations for the New York Custom House for the coming year, as follows: Collector's office, 1154 persons; total salaries, \$1,491,415. Naval office, 92 persons; total salaries, \$157,720. Surveyor's office, 41 persons; total salaries, \$61,520. Appraiser's office, 360 persons; total salaries, \$482,540. Grand total, 1647 persons; total salaries, \$2,193,195. In 1885 the number of persons employed in collecting the revenue at the port of New York was 1512, with salaries aggregating \$2,000,178. The total estimated expense of collecting the revenue of the United States for 1887, if the recommendations of the Secretary in regard to consolidating districts are adopted, is \$6,501,582. The total expense for 1885 was \$6,918,221. In 1885 it cost at this port 2 1/2 cents to collect \$1 of revenue.

Occasional shipments of gold from New York excite increasing interest in the exports of produce and merchandise, which for two years compare as follows, as gathered from the recent statements from the Bureau of Statistics:

	1884.	1885.
Beef, pork and dairy products	\$96,450,000	\$93,700,000
Mineral oils (petroleum)	49,100,000	49,200,000
Paraffine, &c.	147,800,000	129,700,000
Breadstuffs	116,200,000	101,300,000
Cotton (total for four months ending Jan. 1)	116,200,000	101,300,000

Except for mineral oils all exports show a decrease of valuation, although in exceptional cases the quantities exported may have increased.

Among the first bills introduced in the present Congress was one for the Baltimore and Ohio Railway bridge at Arthur Kull, over the Staten Island Sound, thus connecting the States of New York and New Jersey. After it has passed through both Houses of Congress it must be approved by the Legislatures of both States before work can be begun. The width proposed for the middle pier is 65 feet, and it is proposed to have an opening of 200 feet on each side. As an enormous tonnage passes the point indicated, comprising something like 100,000 vessels annually, those interested in navigation will vigorously oppose the scheme. Opposing resolutions introduced into the New Jersey Legislature embodying an appeal to Congress were referred to the Committee on Riparian Rights by a vote of 35 to 20.

In an address before the United States Pottery Association the president stated that the art is now in such an advanced stage of development in the United States that American goods are competing sharply with European products. Foreign manufacturers are now copying our shapes and sizes. The number of kilns in operation is 275; amount of capital, \$5,000,000, and the estimated annual capacity \$8,000,000.

The value of real estate in New York and low rates of interest for loans on mortgage are closely related. At present money eagerly seeks investment at 4 1/2 per cent. on city property. Three important corners in Broadway have changed hands recently. No. 58 Broadway, running through to New street, brought \$470,000 for 4537 square feet, about \$101 a square foot. No. 456 Broadway, the southeast corner of Broome street, in the dry-goods district, the transfer of which was recorded at \$225,000, comes out at \$91 a foot, while the corner at Thirty-third street brought \$49 a foot. A comparison of these figures shows that, while property near Wall street holds its value firmly, first-class commercial property both up and down town shows relatively a larger increase in value. Several authorities agree that property on Broadway has been benefited by the surface road. As a whole, real estate was never better.

Brazil, as a field of enterprise for manufacturers in the United States, is the subject treated by a Rio correspondent under a recent date, as follows: "There is nothing the Brazilians desire more than intimate relations with the United States. The harbors of the Empire are crowded with the steamships of England and France, and the products of those two countries are sold everywhere. Everywhere there are agents of English and French firms. If a Brazilian wants to buy machinery or cotton goods he can find in Rio de Janeiro, Para, Pernambuco or Santos agents who will take his order and get the articles from Europe for him. But if he wants American machinery or cotton goods he must take a long journey to the States to get them. Attempts have been made from time to time by American merchants to get control of the markets of Brazil, but they have gone about it without considering at all the requirements of the trade. They have gone about introducing their wares into the markets of the Empire in the same manner that they would go about introducing them into the markets of Missouri or California, and the consequence is that they have withdrawn from the attempt disgusted and indignant. Again, they

have sometimes sent out irresponsible men who went on a junketing expedition with their employers' money and did nothing else. The customs laws of Brazil are vexatious in the extreme, the Brazilians being great sticklers for details in such matters. But if shippers would use care and patience the laws would not be troublesome. The dashing, hail fellow-well met, carry-a-place-by-storm drummer, whose sales in Western cities make his employers rub their hands in glee, is not the sort of a fellow for Brazil. The drummer who succeeds here must be as polite as Chesterfield, as persistent as an office seeker, as calm as a statue, and as sharp as a needle."

As illustrating the effects upon the country at large in case the 50-cent Bland dollar forces gold out of circulation, the report of John A. McCall, Superintendent of the Insurance Department of the State of New York, has a special significance. This statement shows that on January 1, 1885, the life and fire insurance companies of this State, and the life and fire insurance companies of other States doing business in this State, held United States bonds which had a par value of \$45,570,731.73. Besides the United States bonds, the savings banks and insurance companies held other stocks which can be paid off in silver. The table given below shows the total amount of United States bonds and other stocks held by them on January 1, 1885; their holdings are as great now:

	U. S. stocks and bonds.	Total stocks and bonds.
Savings banks	\$131,628,000.00	\$392,540,000.00
Trust companies	22,578,850.00	31,161,301.00
Life insurance (N. Y.)	8,091,193.73	92,377,230.04
Life insurance (other States)	1,392,990.25	59,623,405.17
Fire insurance (N. Y.)	25,801,207.75	38,732,246.29
Fire insurance (other States)	7,282,344.00	45,673,882.36
Total	\$202,718,241.73	\$530,067,016.89

The savings banks also had mortgages and had loaned money on bonds. Their total resources in this direction amounted to the large sum of \$141,944,250.

Geo. R. Blanchard formerly vice-president of the Erie Railway, has accepted the position of commissioner of the new Chicago east-bound freight pool.

The National Association of Marine Engineers, elected Andrew Ritter of Chicago, vice-president; Henry G. Payne of Buffalo, president.

The ferry from Williamsburg from Roosevelt and Grand streets, this city, reorganizes as the Brooklyn and New York Ferry Co. The consideration named in the conveyance is \$3,000,000.

Mayor Thurber, of Marquette, Mich., has sold 36,000 acres of pine land on the Dead River to a New York firm for \$360,000. The land is estimated to have 200,000,000 feet of standing pine upon it, which will be made accessible by the building of 5 miles of railway next spring.

Steel Ties in Germany.

The figures below indicate the progress made in Germany in the use of iron and steel sleepers:

Year.	Wood ties.	To Iron ties.	To Steel ties.	Iron ground plates.
1880-81	56,906,380	1,001	1,418,241	1,083
1881-82	56,691,753	1,093	2,189,836	1,077
1882-83	56,569,541	1,094	3,394,100	1,096
1883-84	56,744,698	1,094	5,140,772	1,093

Herr Bueck, the general secretary of the German Ironmasters' Association, has presented to that body a report on the employment of steel railway sleepers in Germany. He regrets to find that, according to certain appearances, wooden sleepers appear to be again coming into favor in Germany, because the several Governments seem desirous of favoring forestry. Contrary to the recommendations of competent engineers, beechwood sleepers have been laid down recently; 2,000,000 sleepers were laid in the eastern part of the Empire last year, and that of this quantity one-third were not 1 sleepers. The German forests could only supply 15,000 oak sleepers. Of the quantities submitted for tender during 1884-85 in the same part of the Empire, German producers were only able to supply 1 per 1000 of oak and 5.04 per cent. of pine. Should beechwood sleepers prove satisfactory, a sufficient supply may be obtained in the western part of the Empire. But experiments with sleepers of this wood in France have not given satisfactory results. In favoring the employment of wooden sleepers, therefore, with a view to the encouragement of German forestry, the German Government are simply promoting the foreign timber-growing industry rather than native metalurgical industries.

The Keystone Manganese and Iron Co., of Johnstown, Pa., who are engaged in mining manganese ore in Arkansas, send the *Bulletin* the following analysis of the ore from their Southern mine, being the average of seven shipments to the Cambria Iron Works:

	Per cent.
Metallic manganese	50.42
Metallic iron	3.64
Phosphorus	0.04

The company are now washing the ore and expect to raise the percentage of metallic manganese in their ore thus prepared for shipment to 55 per cent.

In our editorial on the Lake Superior iron-ore industry we stated erroneously that the cost of handling at Cleveland had declined almost 2 to 3 per cent. It should have been the total cost of placing iron ore on the Cleveland market declined almost 2 to 3 per cent. in 1885 as compared with 1884.

Exports.

The following list embraces the Exports of Hardware, Machinery, Iron, Metals, &c., from the port of New York, for the week ending January 19, 1886:

Danish West Indies		Nova Scotia	
Quant.	Val.	Quant.	Val.
Hdw., pkgs.	19	Hdw., cs.	5
Ag. imp., pkgs.	2	Sew. ma., cs.	2
Rifle	1	Mf. iron, pkgs.	4
Pumps, pkgs.	1		
Mf. iron, pkgs.	50		
Cartridges, cs.	1		
Hamburg.			
Hdw., cs.	255	Hdw., pkgs.	177
Mach'y, pkgs.	3,245	Car-wheels, cs.	34
Firearms, cs.	3	Nails, cs.	31
Clocks, cs.	40	Cartridges, cs.	6
Copper, cs.	35	Saws, cs.	6
Ag. imp., pkgs.	151	Clocks, pkgs.	12
Wrappers, cs.	18	Sew. ma., cs.	3
Pumps, pkgs.	1	Ag. imp., pkgs.	9
Cop. ore, pkgs.	202	Mf. iron, pkgs.	1,320
Knit. ma., cs.	3	Pumps, pkgs.	3
Seals, cs.	1	Wrappers, pkgs.	10
Mf. iron, pkgs.	6	Tacks, cs.	5
		Rifles, case	1
		Mach'y, pkgs.	2
Dutch West Indies.			
Hdw., cs.	2		
Nails, box	1		
Washing ma.	2		
Sew. ma., cs.	3		
Ag. imp., pkgs.	1		
Tinware, case	1		
Mf. iron, pkgs.	1		
Rotterdam.			
Tin ashes, bbls.	9		
Christiana.			
Hdw., cs.	4		
Ag. imp., pkgs.	9		
Bremen.			
Ag. imp., pkgs.	28		
Mf. iron, pkgs.	2		
Tin medals, cs.	2		
Clocks, case	1		
Hdw., pkgs.	87		
Mach'y, pkgs.	11		
Stettin.			
Mach'y, pkgs.	10		
Copenhagen.			
Hdw., cs.	7		
Mf. iron, pkgs.	16		
Clocks, cs.	74		
Amsterdam.			
Hdw., cs.	11		
Mf. iron, pkgs.	5		
Ag. imp., pkgs.	12		
Antwerp.			
Hdw., cs.	33		
Sew. ma., cs.	290		
Ag. imp., pkgs.	3		
Firearms, cs.	7		
Hull.			
Iron safe	1		
Hdw., cs.	44		
Mach'y, pkgs.	4		
Ag. imp., pkgs.	54		
Hdw., cs.	1,512		
Clocks, cs.	7		
Mf. iron, pkgs.	2		
Glasgow.			
Mf. iron, pkgs.	1		
Hdw., pkgs.	50		
Rifles, case	1		
Cartridges, cs.	3		
Mach'y, pkgs.	4		
Sew. ma., cs.	10		
Arms, case	1		
Clocks, case	1		
London.			
Pumps, pkgs.	5		
Mach'y, pkgs.	59		
Hdw., pkgs.	10		
Print, press, cs.	11		
Iron drums	37		
Wrappers, cs.	17		
Ag. imp., pkgs.	506		
Rifles, cs.	4,354		
Cartridges, cs.	9		
Sew. ma., cs.	101		
Mf. iron, pkgs.	139		
Clocks, cs.	150		
Nails, case	8		
Bristol.			
Clocks, cs.	31		
Zinc ash, bbls.	84		
Haver.			
Ag. imp., pkgs.	31		
Sew. ma., cs.	29		
Wire, cs.	30		
Copper, cakes	108		
Liverpool.			
Hdw., pkgs.	132		
Ag. imp., pkgs.	95		
Mf. iron, pkgs.	3		
Steel, bbls.	48		
Mach'y, pkgs.	38		
Nails, kegs.	50		
Stumpware, cs.	2		
Copper matte,	2,400		
Clocks, pkgs.	112		
Brass goods,	5		
Copper ore,	5		
Cooper, cs.	13,300		
Steel tires	35		
Wrappers, cs.	4		
Guns, cs.	5		
Iron, pkgs.	1		
Cutlery, cs.	3		
Wire rope, cs.	22		
British Guiana.			
Clocks, case	1		
Mf. iron, pkgs.	1		
Hdw., case	1		
Ag. imp., pkgs.	1		
British Australia.			
Hdw., pkgs.	382		
Pumps, pkgs.	71		
Wire, cs.	3		
Mf. iron, pkgs.	186		
Sew. ma., cs.	175		
S. rollers, cs.	15		
Steel, cs.	46		
Clocks, cs.	99		
Cartridges, case	1		
Ag. imp., pkgs.	1		
Tacks, case	1		
Nails, cs.	74		
Wash, mach.	1		
Mach'y, pkgs.	3		
British West Indies.			
Nails, cs.	2		
Hdw., pkgs.	39		
Copper ware,	2		
bbls.	2		
Ag. imp., pkgs.	8		
Clocks, case	1		
Mach'y, pkgs.	4		
Cutlery, case	1		
Tinware, case	5		
W. mill, pkgs.	6		
Mf. iron, pkgs.	7		
Sew. ma., cs.	5		
Nails, kegs	157		
Iron, bbls.	10		

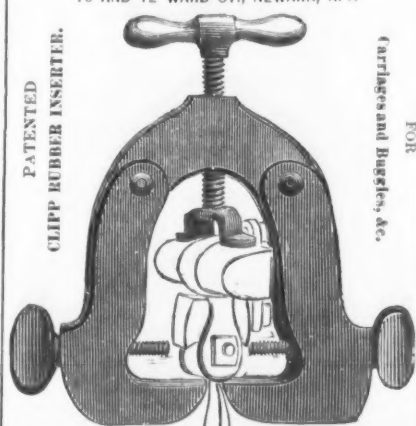
Mr. Jacob Reese, of Pittsburgh, has gone to Birmingham, Ala., to tell the phosphorus-stricken ironmasters of that section how to make basic steel by the process which he invented with so much secrecy and success. Mr. Reese, if he is correctly reported by the Pittsburgh Times, has also upset all the notions of geology and chemistry, and science stands aghast at the following theory of the versatile inventor: "The workings of the basic process are not fully shown in the iron here, as it contains no phosphorus. The ore used is igneous ore, or that thrown up by fire and by it deprived of the phosphorus. In the South the ores are hydrates, and the water by which they were deposited left much of this phosphorus also. The percentage is so high that steel cannot be made from the iron by the ordinary process."

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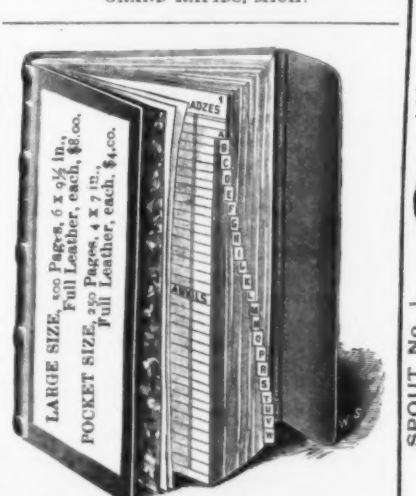


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The Perfection Cultivator.

The Machine and Steel Pulley Co., Indianapolis, Ind., are manufacturers of the Perfection Cultivator which is illustrated herewith, the general features of which will be readily understood by reference to the cut. One of the principal features, it will be observed, possessed by it is the manner in which the gangs are constructed, enabling them to be easily shifted, and at the same

movement has already taken place. Broadly speaking, too, prices have been steadier during the second half of the year than they were in the first half, and, where there is a fall recorded, it is generally less marked. None of these movements are of a nature which would justify one in asserting that there has been any appreciable improvement in trade, or even that we are on the eve of a general recovery. But they do encourage the hope that business is undergoing a change for the better, and that more prosperous times are near at hand.

The question arises, What are the prospects of business during the present year? To that no definite answer can be given, but we should say that the industrial outlook has brightened. For one thing, it is evident, from the recent activity on the Stock Exchange, that the spirit of speculation, so long dormant, is reviving, and people are

Petroleum as a Fuel.

It is a remarkable fact that neither the United States, which have long produced the most oil in the world, nor England, which has been the parent of a whole series of liquid-fuel inventions, should have reaped any benefits from these advantages, and that the question of successfully using oil furnaces should have been solved by the Russians in the region of the Caspian. This, however, according to an English paper, is capable of easy explanation. In this country, we find it stated, wood and coal have always been so cheap that there has never been any necessity to resort to oil, while, further, the demand for oil has been such that very little has been left to run to waste. In England, again, where there is a deal of waste oil arising from the manufacture of paraffine from shale, the price of the

supply can be turned on or cut off. The two fluids enter the pulverizer, but are prevented from mingling by a diaphragm. This contains notches filed in the lip of it, through which the petroleum trickles, to be blown off by the steam escaping from the under side. The application of a light sets the steam and oil commingled spray in a flame, extremely intense, but which can be increased or deadened by simply adjusting the cocks, the same way as an ordinary gas stove.

The simplicity of the liquid fuel furnace, and the ease with which it can be controlled, rendered it a favorite with engineers. For instance, in the case of the oil steamers running on the Caspian between Baku and the mouth of the Volga, the engineers simply turn on the flame at starting, and concern themselves no more about the furnaces beyond just giving them an occasional look until "Davit Foot," or "the 9-foot shallows" is reached in two days' time. How different this from the glare and heat and grime and toil in the stokehole of the coal burning steamer. The sufferings of

stokers, particularly in hot climates, are unfortunately too well-known to those who have been on a voyage. On the oil-burning steamer there is absolutely no stoking whatever, and thus not only is a large amount of human misery avoided, but the owner saves by the labor abolished. Another drawback of coal-burning ships, always irksome and disgusting to passengers, is the process of coaling the vessel, which is as bad as having the sweep in one's house. This also is done away with, the liquid fuel being pumped on board the oil using steamer like water, and requiring further but a minimum of time. If petroleum refuse were only half as plentiful in Western Europe as it is in the Caspian district, these advantages would render it the favorite fuel, particularly on board steamers traversing the Suez Canal. As it is, the competition of coal and the disinclination to change existing furnaces for liquid fuel ones, while the supply of cheap waste oil is limited, are drawbacks not easy to overcome.

New Adjustable Foot Press.

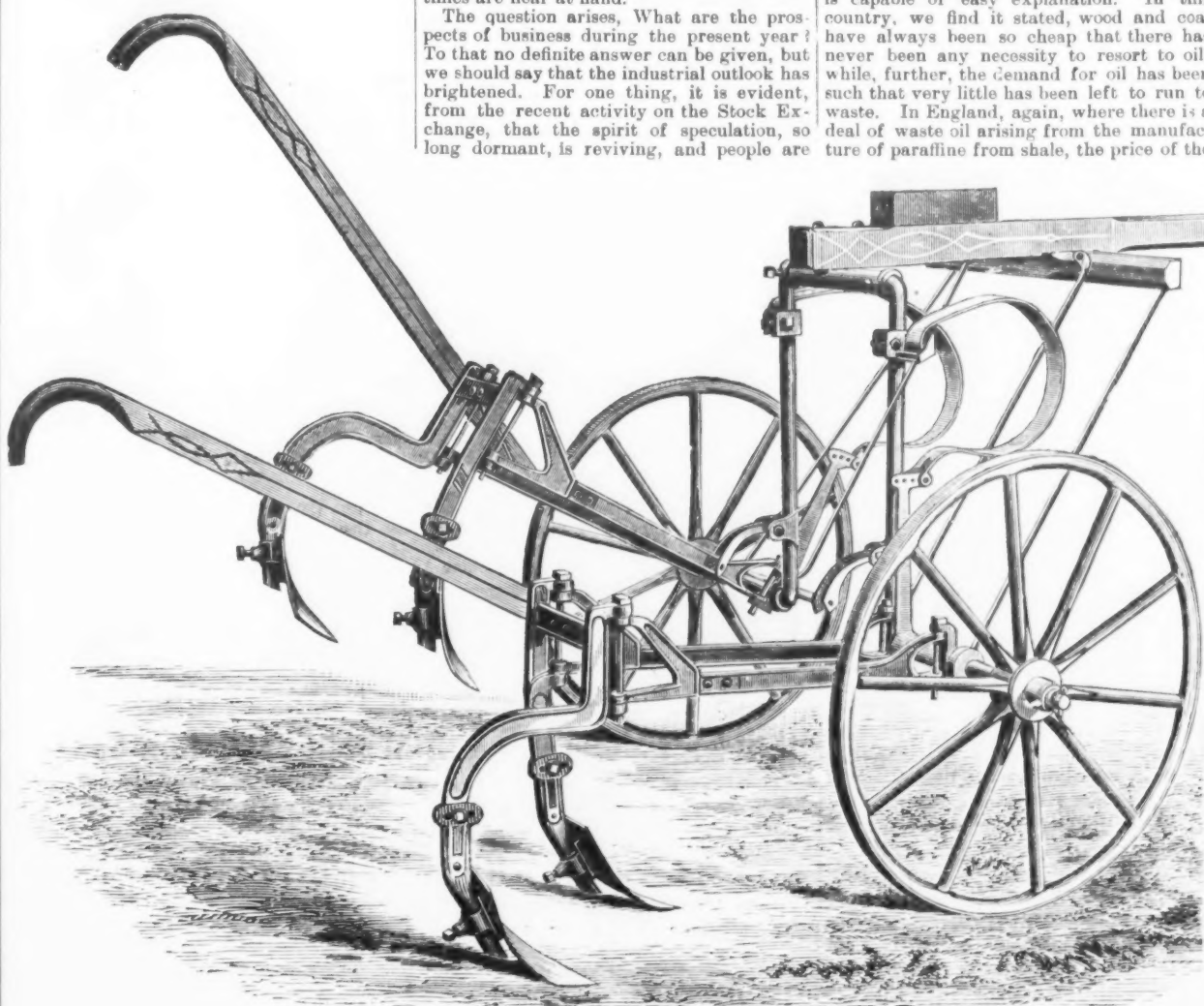
The adjustable foot press shown in the accompanying engraving has been newly designed, with the view of combining the greatest possible convenience for operating with strength and accuracy. Its construction embodies a number of valuable features. It has a very deep frame of a section calculated to give the greatest strength for the amount of metal used, its shape being derived from a parabola of such proportions as to give ample and uniform strength throughout. A new and handy device is used for adjusting the position of the press in such a way as not to raise the dies to a higher position when inclined. This is an advantage to the operator which will be readily appreciated. The change from upright to inclined position can be effected in a very short time by simply revolving the screw-wheel shown below the bed of the press after loosening the side nuts and turning over the

the press, it is claimed, will work as easily as the very smallest foot press. The slide-bar has scraped bearing surfaces of extraordinary length and width, giving great durability and superior accuracy for the working of the dies. The gib for the slide-bar is clamped fast to a flat face, so that it cannot work loose, and is provided with a new eccentric adjustment for setting to position, instead of the usual set-screws, which are both slower and less delicate in their action. A set of die clamps is used consisting of hook-headed steel bolts, hardened and carefully ground, which slide in long, true holes, and, descending upon the dies, hold them securely and accurately. They, moreover, dispense with the delay of removing bolts and nuts when changing the dies. Rubber bumpers are inserted in the treadle and treadle-stop, avoiding the banging noise and jar so usual with tools of this class, and greatly facilitating the working of the press. The slide-bar is so arranged that bushings for all kinds of shanks can be quickly and securely clamped by means of a vertical pressure key. The slide is also arranged for holding on large plate punches for irregular work, which are not generally made with screwed shanks. A shute and pan very conveniently attached are furnished with the press for catching punchings or sliding them over into a basket or box.

The weight of the press is about 1500 pounds; its extreme height from floor to top of frame, 58 inches; the hole through bed measures 10 x 14 inches; the distance back from center of slide-bar, 9 1/2 inches; width between the die clamps, 20 inches; greatest height from bed to bottom of slide-bar, 7 1/2 inches; maximum stroke of slide-bar, 4 inches, or 2 inches with back fulcrum; ratio of leverage varies from 1.5 to 1.30. The press is intended for cutting and stamping large can tops and bottoms, cutting can bodies in gang dies, and for cutting out pieced tinware, sheet-iron work, &c., up to 10 x 14 inches. It is built by the Ferracute Machine Co., of Bridgeton, N. J.

Three tall chimneys belonging to Kunheim & Co., of Berlin, Germany, were lately destroyed by means of gun-cotton. The largest was about 147 feet high, and 10 feet diameter at the base. In order that it should fall outward from the city, the charge of gun-cotton (about 57 pounds) was attached in portions to the side next the city, and to the adjacent sides. All three were exploded simultaneously with a magneto-electric apparatus. The chimney, instead of falling obliquely, collapsed vertically, and on inspection the four walls of the pedestal were found to have been driven outward. The bricks were all detached from each other, and nearly all entire. The debris was thrown a very little distance. The two other chimneys, treated similarly, fell as was expected—i. e., obliquely away from the city. One of them, in falling, broke in two about the middle.

In a case of alleged underestimation of imported merchandise which came before Judge Shipman and a jury in the United



THE PERFECTION CULTIVATOR.

time to hold the shovel in a horizontal, parallel motion when moved from side to side, thereby keeping the shovels in a direct line with the work—that is, fronting square toward the horses instead of diagonally or edgewise, as in other cultivators. The shovel, when thus shifted, it is claimed, does the work with much more freedom and with much less draft. Attention is also called to the fact that the arch is high and at the same time adjustable as an important point that farmers will appreciate. The spring and its connection with the gangs are also alluded to, and the point made that these are connected in a manner which makes the vertical movement of the shovel easy to operate by simply moving the set-screw that is at the head of the spring. The gangs can be set in a position that will hold the shovels at any point desired, and when moving the cultivator from one place to another the gangs can be thrown into jaws that project from the arch, where they are securely held until the operator desires to take them down.

Prices in England for the Last Six Months.

The London Economist of recent date reviews the English markets for the past six months as follows:

A comparison of the prices of commodities now and at the beginning of the year shows that in most instances a lower level has been reached. In the articles classed under the head "Minerals," the fall, as compared with the close of 1884, is almost unbroken, the only exceptions being steel rails, which the combination of makers have kept at the same price, and lead, which is 17/6 per ton higher. Among the raw materials for our textile manufacturers silk and flax have reached higher prices, but cotton has fallen to a phenomenally low point, and wool, hemp and jute are cheaper. Most food products also stand at low quotations, the exceptions being American wheat, potatoes and rice. And a like downward movement is exhibited by the miscellaneous articles, where sugar is the only article in which any improvement is recorded. Thus to manufacturers and wholesale traders 1885 has proved another year of hope deferred. It has brought them no relief from the previous long-continued and persistent fall in prices, but, on the contrary, has accentuated the decline, and entrenched still further upon the previously narrow margin of manufacturing profits.

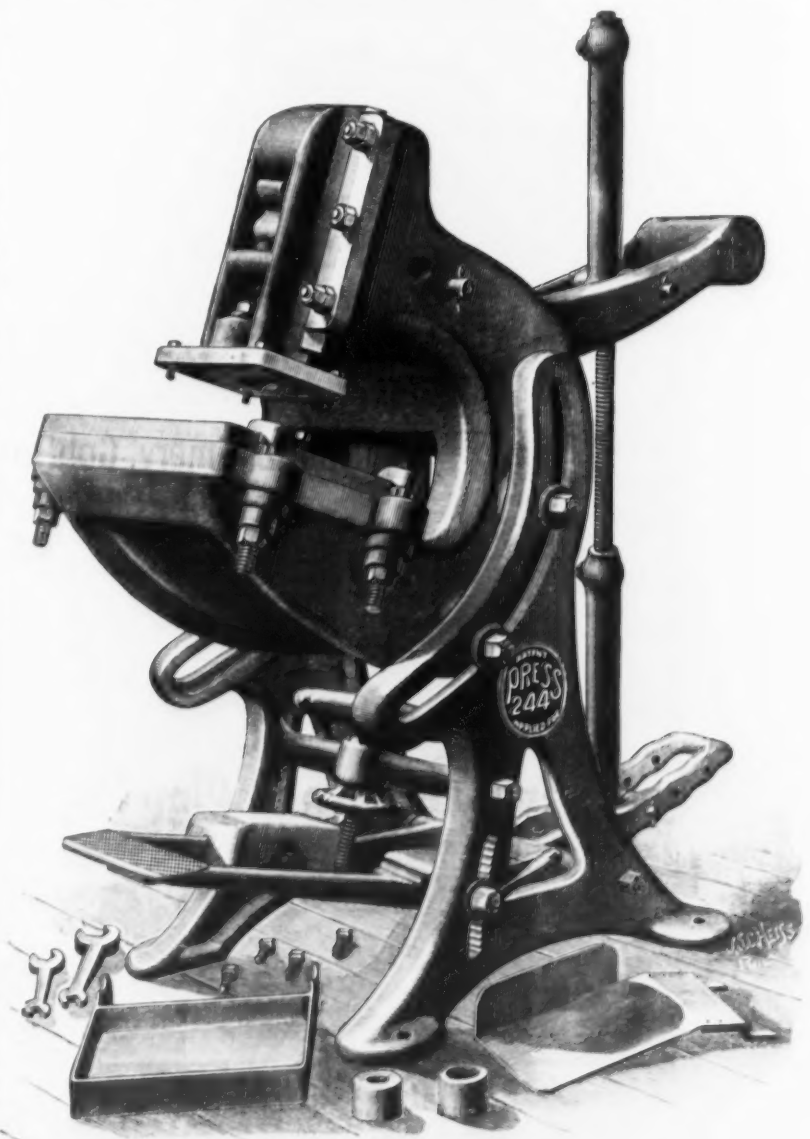
When, however, we look to the record for the past half year some slight indications of improvement are observable. Prominent among these is the rise in the price of pig iron, the movements in which act frequently as a trade barometer, pointing in advance to coming recovery or depression. This rise, it is true, has been largely speculative, and that the speculation has been overdone is shown by the fact that during the past few weeks quotations have been declining. In part, however, it has been the legitimate response to the improvement of trade in the United States, and has some increase of demand to justify it. Another favorable feature is the better tone that has lately pervaded the Mining Lane markets, where the statistical position generally is held to indicate that the limit of the fall of prices has at length been reached, and where in some instances—as, for example, sugar—an upward

more disposed than they have been for some years past to promote new enterprises and new undertakings. Some fresh outlets for trade are thus certain to be created, and in some directions—for example, the construction of railways in China and the opening up of that vast Empire to foreign commerce—the potentialities are great. Now, too, the political horizon has grown somewhat clearer. The French adventure in Tonquin no longer interferes with our commerce with the East. The Afghan difficulty, if not quite settled, is in a fair way toward adjustment. Burmah has been annexed, and in South Africa military operations have been brought to a close. Thus various causes of trade unsettlement have been removed, and business enterprise is freed from serious restraints. No one, moreover, can read the reports from our chief industrial centers without observing that, although there is little actual improvement to record, there is a very general conviction that the conditions of business have changed for the better, and already the United States is leading the way in a trade revival which as it progresses must make its influence felt here. There are, of course, dark spots in the outlook. We are almost as far as ever from a settlement of the Balkan imbroglio, and at home the strife of rival political parties runs high, and may before long necessitate another appeal to the constituencies. On the whole, however, the situation has improved, and 1886 opens under happier auspices than its predecessors.

Mammoth Gas-holders.—Perhaps one of the largest gas-holders in the world is the one at Old Kent Road, London, England, belonging to the South Metropolitan Gas Co. It is a telescopic holder of the newest shape, and designed by George Livesey, at present engineer to the company. It is surrounded and kept in position by a framing 160 feet high, consisting of wrought-iron uprights, with five tiers of struts and 10 sets of diagonal braces. The tank is 218 feet in diameter and 55 1/2 feet in depth; the inner holder 208 feet in diameter, 53 1/2 feet deep; the middle lift 211 feet in diameter and 53 feet 3 inches deep; the outer lift 214 feet across and 53 feet deep. Altogether it has a storage capacity of 5,400,000 cubic feet of gas. In the construction of this holder the English and French systems of guiding rollers were combined, a new feature in England. Those on the apex of each lift were fitted with one radial roller on the English system, and two tangential rollers on the French plan, and the effect of this combination was soon apparent. With the radial rollers the whole force of the wind against the holder was found to bear on about a quarter of the number of the columns or standards; with the tangential rollers it was distributed on about one-half; but when the two were combined the wind pressure fell on three-fourths of the columns so that there remained no tendency to distort the guiding frame. In the holder there are man-lids of the Livesey pattern over the inlet and outlet pipes. Access can thus be obtained at any time and the pipes cleared of naphthalene without any of the gas in the crown being lost. Another huge gas-holder is near Upper Kennington Lane, London, which, though not quite so high, is larger in diameter, and has a capacity of 3,000,000. Another of the same group has a diameter of 160 feet, height 70 feet, and a capacity of 1,250,000.

commodity has always advanced when some new invention has appeared on the scene and blighted the hopes of the inventor and his promoters. But in the Caspian region the conditions have been more favorable. Very little timber is to be obtained on its barren coasts, and the inferior coal brought down the Volga from the Don for the Caspian fleet used to cost from \$25 to \$35 a ton. At the same time close to the dock yard at Baku were oil wells, where the crude oil could be had for almost nothing when a fountain occurred, and refineries where the waste oil rarely fetched more than a few pence a ton. Thus the Russian Government and the steamboat companies on the Caspian were compelled by the exigencies of cost to endeavor to make use of the liquid fuel lying in such inexhaustible quantities so readily at hand, and for years they appropriated every furnace invented in this country and America. Having in their employ practical German engineers, to whom were added Swedish ones, when the Nobles began to develop the oil industry these inventions were tried and tested and improved upon, until by degree every difficulty was overcome and principles established which regulate the successful use of the fuel in Russia to-day.

Some of these difficulties are well worth mentioning, if only for the purpose of preventing any one from treading uselessly the steps so laboriously traversed by the engineers in Russia. At first, rough furnaces were made by forming a series of grates, or grid-dles, through which the oil trickled and flared in its course. There was nothing very original about these, and they disappeared the moment the system of pulverizing the oil came into use. The merits of this innovation are divided between Aydon, an Englishman, and Shpakovsky, a Russian engineer. Both filed their inventions in London about the same time without having had access to each other's plan, and the defects of the one were obviated by the merits of the other. The principle of breaking the oil into bubbles or spray and driving it into the furnace was common to both, but failure or success really rested upon the agent employed to achieve this. Aydon used superheated steam, Shpakovsky a blast of hot air. The former was the better of the two, but Shpakovsky beat it subsequently by taking a leaf out of his rival's book and using ordinary steam. In 1869 and 1870 he fitted out several vessels in the Caspian with his steam pulverizer, and some of these have been using them continuously since. The Iron, for instance, running from Baku to the Volga has made over 250 voyages with her Shpakovsky furnaces, which must be considered a good test for an invention which, after all, only ranks as the second best in the Caspian. The first and favorite with the various steamboat companies is a furnace invented by Herr Lenz, a German engineer, formerly in the employ of the Caucasus Mercury Co., who improved in 1872 upon Shpakovsky's furnaces by introducing a different kind of regulator and using a flat flame instead of a conical flare or ring of jets. This he has constantly improved upon since, and, pending further advances, it is the best model for foreign imitation and improvement. Briefly it may be described as consisting of two horizontal pipes thrust a little way into the furnace. The upper one is fed with oil, and the lower one with steam, each pipe being regulated by a cock, by which the



New Adjustable Foot-Press Built by the Ferracute Machine Co., Bridgeton, N. J.

upper pitman sleeve. The pitman is of novel construction, enabling the position of the slide to be adjusted with great accuracy and rapidity. It consists of a screwed rod with one side flattened, which can be slid up and down in either of the two pitman sleeves by loosening the set screw holding the rods against the threaded part of the hole in the sleeve.

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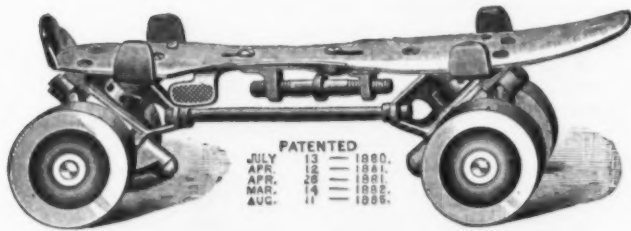
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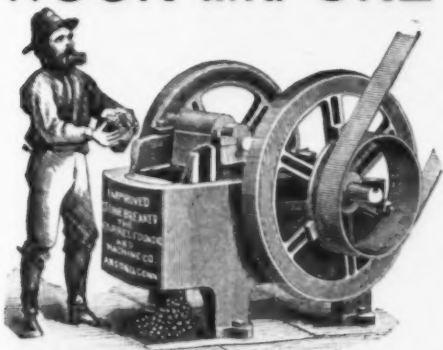
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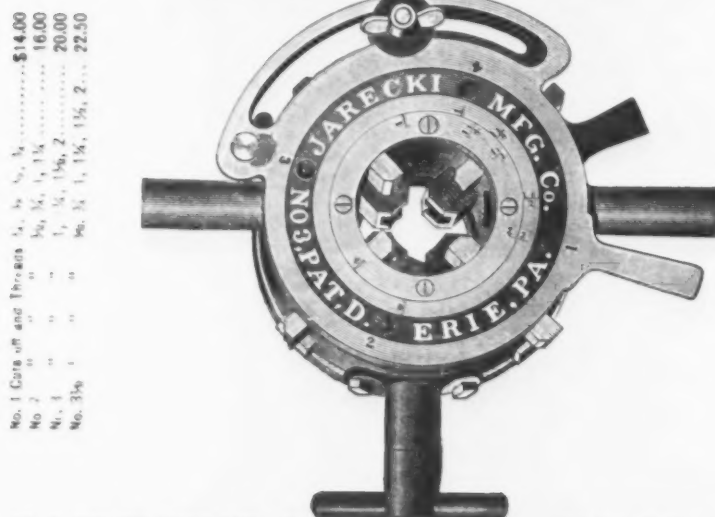
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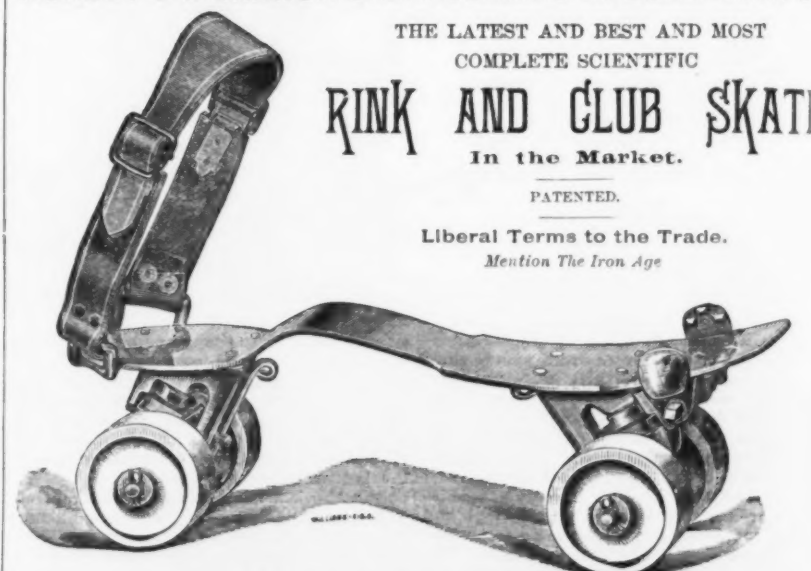
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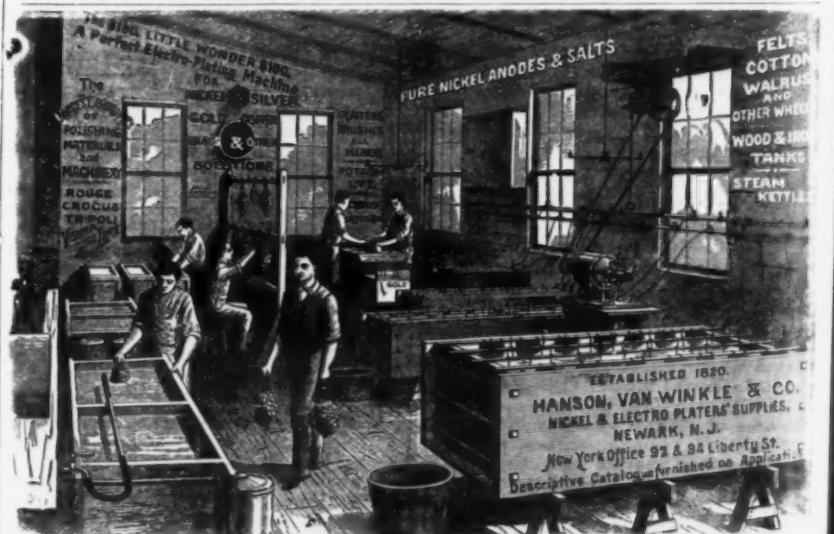
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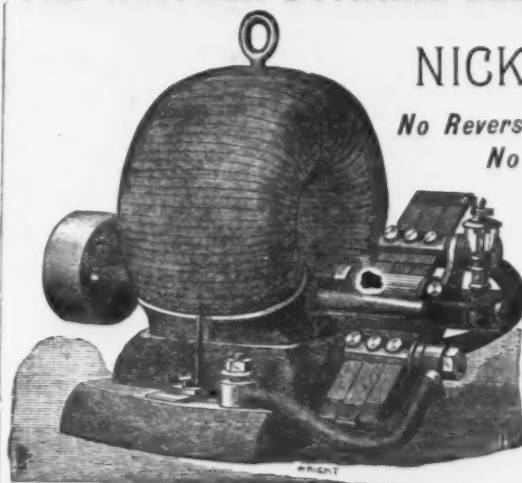
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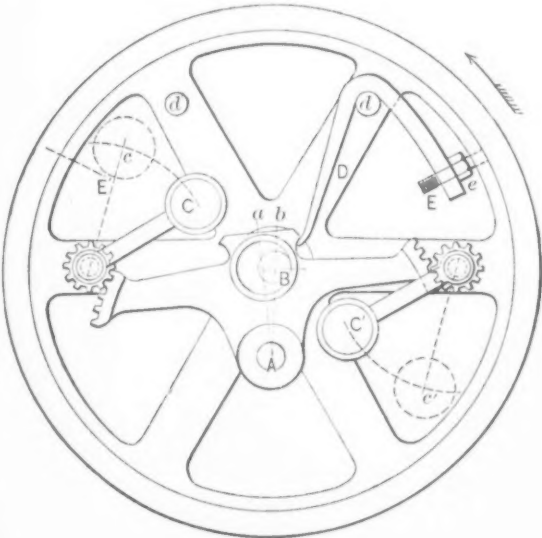
The LAMONT is the original Combination Strop and the standard. It positively has no equal. If your barber does not have it, send to us. Belt of Russia leather.

MECHANICAL.

Automatic Cut-off Governor.

Mr. J. W. Thompson, of Salem, Ohio, the well-known inventor of the Thompson Indicator, contributed to the *English Mechanic* some months ago a short article describing an automatic cut-off governor for engines of small size. The governor is shown in the annexed cut, and is so simple and plainly shown that only a brief description will be necessary.

The eccentric, seen surrounding the shaft B, is simply an annular hub or rim project-



Automatic Cut-off Governor.

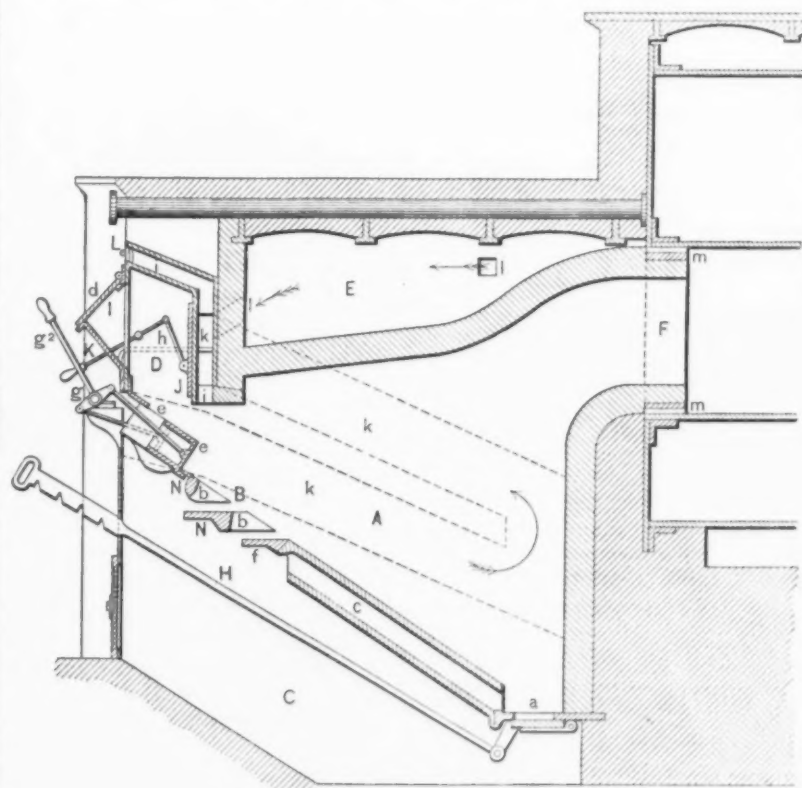
ing from a plate which is pivoted at A to the containing wheel, and carries two arms terminating in segments concentric with A. Two pinions fitted to work on studs in the wheel mesh into these segments. To these pinions are rigidly attached arms terminating in weights, C, C', the outward movement of which to positions c c' shifts the center of the eccentric from line a A to B a, in which position it imparts a movement to the valve coincident with the piston, but (with any form of slide-valve which admits steam by movement from the induction end) in an opposite direction, and of just sufficient extent to overcome the lap of the valve and show a slight trace of opening at each induction period. A spring, D, the tension of which is adjusted by nut e on stud E, furnishes the centripetal force. For close regulation this spring should have as much tension as possible without introducing instability of equilibrium, the proper speed being got by more or less weight at C C'.

The spring should be as strong as possible without danger of breaking under the tension to which it is subjected when the weights are expanded to positions c c'. The wheel is secured to the shaft in such position that pivot A will be diametrically opposite the crank. It will then be correct for either direction of motion. The parts are shown in proper position for rotation in the direction of the arrow. For the opposite direction such changes will be required as will conform to the appearance the drawing presents when viewed in a looking-glass. For this purpose a place for tension-stud E is provided at E' and one at d' for stud d.

Henley's Monarch Fence Machine.

The accompanying engraving illustrates in part a new device for erecting what is known as "combination fence" (picket and wire combined), now being placed before the public by Mr. Micajah C. Henley, of Richmond, Ind. This machine was patented July 21, 1885. As will be seen by referring to the illustration, the machine is composed of two parts—the weaver, or machine proper, shown at the left, and tension spool frame at the right. The wire is first stretched the full length of the field or lot to be inclosed, while the weaving machine is placed in position at the end the operator chooses to commence at, and the tension-spool frame or apparatus for taking up the slack in the wire opposite to it, as shown in the cut. The two gear-wheels shown on the side of the weaving-machine frame operate upon a similar gearing cast solid with what are termed the "hollow

a platform for the weaving machine is supplied with a gear tooth bar upon which a gear-wheel and lever operate. This is used to move the entire apparatus along, at the same time forcing the slats or pickets solidly into their place as the work progresses. The entire apparatus can be readily operated by a boy, is portable, weighing but 165 pounds, and when not in use can be packed, without taking apart, in a space of 6 feet by 20 inches by 13½ inches. The improved Monarch machines, in place of the gearing to operate the twisting hubs working at right angles to the face of machine, have a bevel gear with crank attached, operating parallel with the face of the apparatus, not shown in the accompanying engraving. The improved tension spool frame, also not represented fully by cut, is very similar in form to the weaving apparatus shown, the new device embodying but one set of spools. The frame contains five spools, by which double strands of wire, any size desired, may be attached, as hereafter described. The same is held in an upright position by two iron rods or braces, one at each side of frame, running from the outer end of a base to the upper end of spool frame, at which point holes are drilled through the rods for the purpose of inserting stay-bolts in like holes in the frame. The tension on the spools is regulated by two steel springs, bearing upon two sides of spool rims which are attached to the frame proper by cross-pieces of wood, to which they are secured by screws, while the ends of springs, projecting over and beyond the spool rims have square holes punched in them, through which a bolt is passed. The opposite end of this bolt is threaded and supplied with a thumb-screw nut, which, by turning, regulates the tension. When the tension machines are shipped from



The Krudewig Smoke-Preventing Furnace.

the factory a sufficient quantity of wire is placed upon the spools to allow for the twisting of the fence wire in weaving. To the ends of these wires are attached small double eccentric ratchet pawls which catch the fence wire at any given point for the purpose of taking up any slack that may exist in the same. Tension frame, when packed, will

of air-flues in the sides and top of the furnace, moreover, furnish a steady supply of hot air to the fire-box, insuring thorough combustion. The inclined grate B is constructed of a series of parallel bars N N', having teeth which project like the teeth of a comb. These bars, with their projecting teeth b b, are arranged horizontally one over the other, so that the teeth of one tier project over the solid portion of the bars beneath, as shown, the front ends of the teeth being beveled to form an incline. By this arrangement the ashes are unconsumed, fuel falling from each upper tier upon the tier below it, where they are subjected to a fresh draft of air. The constant travel of the fuel over the grate-bars for this purpose is assisted by the plungers e e, arranged at the upper end of the grate. The plates n of the upper tier may be set at an inclination corresponding with the plane of inclination of the teeth of the tier below, and the teeth b of these upper plates are beveled on their under side, so as to leave a horizontal opening of uniform width between the upper tier and that next below.

The grate may be constructed entirely of these comb-plates, or the upper part only may be arranged, the lower portion being made up of a series of parallel hollow grate-bars, e e, which are supported at an inclination conforming to that required in the grate. The lower ends of these bars, e, are left open and terminate immediately over a hinged plate or door, a, at the bottom of the fire-box. An opening is formed on the under side of their upper flanges f, so that a current of air will be constantly drawn through them from the ash-pit below and discharged into the bottom of the fire-box against its rear wall. This current of air passing through each bar e will not only cool it and prevent it from burning out, but, becoming thoroughly heated, will aid combustion. The hinged door a in the bottom of the fire-box and at the lower end of the grate is opened from without by means of a lever, H, for the purpose of discharging ashes.

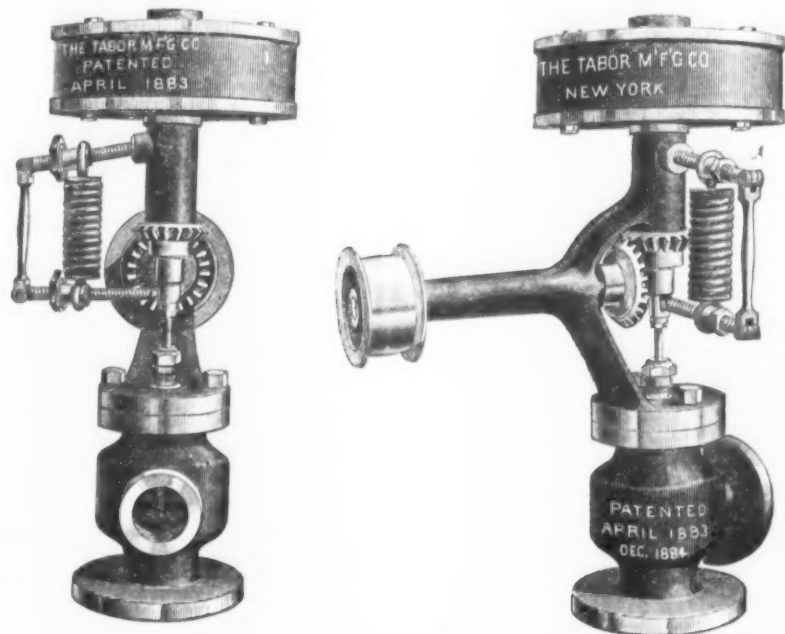
The plungers e e, adapted to slide back and forth on the upper end of the grate, are each connected by a coupling-rod with a shaft, g, supported in brackets upon the outside of the furnace. This is operated by the lever g'. The fuel may be thus forced forward down the grate without opening the furnace.

The Kindewig furnace, we understand, is now being used in many places in Germany and Switzerland, with uniformly satisfactory results. It is claimed to effect a decrease in the fuel consumption of from 10 to 15 per cent.

The Tabor Steam-Engine Governor.

The difficulty in getting a governor that will regulate, within a reasonable percentage, the speed of an engine under largely varying loads has long been apparent. Accordingly, it has been claimed, with good reason, that the good qualities of the

lead and fit for lubricating purposes. Experience soon proved it to give very varied results, sometimes good and sometimes the reverse; in fact, it was not reliable, because of a lack of uniform, correct sizing and purity, and soon fell in disrepute among practical men, though continuing to be well spoken of in the books. In 1868, however, systematic experiments were begun in this country with a view to producing a reliable lubricant from graphite, and the final result has been very satisfactory. Water-dressed dry-foliated American graphite is a little thin flake of graphite of extraordinary properties.



The Tabor Steam-Engine Governor.

plain slide valve engine have often been sacrificed more for the want of a good governor than for any other cause.

The Tabor governor, of which we present two engravings, has been designed with the view to correct the existing defects in the throttling governor and to enable a slide-valve engine to compete in close regulation with the best types of automatic engines. The results have been highly satisfactory, and the makers offer to put the governor on any of the better class of automatic cut off engines, which are noted for superior regulation, and guarantee equal uniformity in running. The governor, as shown in the engravings, is a spring governor, wholly independent of gravity. The weights, which are contained in the upper cylindrical box, act radially, and their centrifugal force is a uniform increase as they move outward. Motion is conveyed from the weights to the valve by two phosphor-bronze bands which pass under suitably placed pulleys, and are attached to the governor stem. The centrifugal force, or resistance to the action of the weights, is furnished by a single spiral spring attached to the adjusting nuts on the speed levers. These levers, it will be seen, are set at an angle, and this angle, which is an important feature in the governor, is such that it gives the correct initial tension to the spring for all changes of speed.

The speed of the engine may be readily changed, to the extent of 60 per cent., while the engine is running, by simply moving the spring toward the governor when a higher speed is desired, or from the governor when a slower speed is needed.

This "speeder" constitutes one of the important features of the governor. Ordinarily spring speeders give the best results when set for some certain speed. If more tension be given to the spring, racing or jumping is apt to follow. If less tension be used, the engine will not govern closely under varying loads. In the Tabor governor these difficulties as described are entirely avoided. The governor stem is steel, large in diameter, with the lower end hardened; there is a hardened steel plate in the coupling upon which the governor stem runs; these hardened steel surfaces are so large that there can be no appreciable wear. The valve has double openings and is made of the best steam metal. The bushes in the valve-case are also made of the best steam

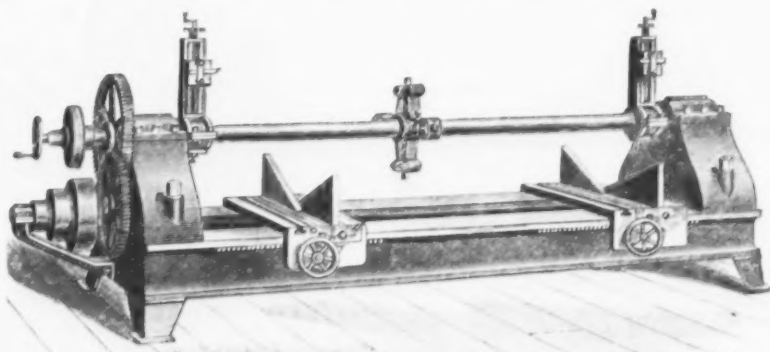
metal, and both are proof against rust and the cutting action of the steam. The interchangeable system of manufacture is strictly followed. The governor is made by the Tabor Mfg. Co. (Messrs. Manning, Maxwell & Morse), of 111 Liberty street, New York.

Graphite as a Lubricant.

With the introduction of heavier machinery the service demanded of a lubricant has become more and more severe. For much of this work it is found that oil will not answer at all, and for much more it answers only at great expense; hence the use of greases and the more solid lubricants, such as graphite, mica, soapstone, sulphur, &c. When graphite first began to be used as a lubricant anything which gave a stove-polish luster when rubbed was assumed to be black-

Cylinder Boring Machine.

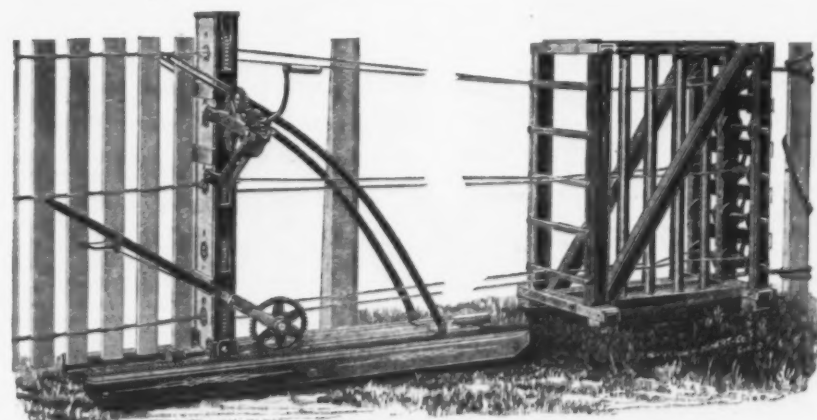
Messrs. Pedrick & Ayer, of the L. B. Flanders Machine Works, Philadelphia, Pa., have lately designed and are putting on the market a cylinder boring machine for new work in shops that can be sold at a moderate price. The accompanying cut was made from a perspective drawing, and is, perhaps, somewhat incorrect as regards proportions. The machine will bore from 8 to



New Cylinder Boring Machine.

22 inch cylinders, facing off the ends and boring at the same time. The flanges are turned afterward, as the saddle to which the cylinder is fastened has a movement of several inches each way. A bent tool is placed in the facing head and the cylinder is moved. The V's that hold the cylinder are each independent and adjustable, allowing any shape of cylinder to be quickly brought central. The clamping device is one of the principal features. A detachable link-chain that can be lengthened or shortened holds the cylinder, allowing very little opportunity for springing. By loosening one collar-screw the bar can be pulled clear of the cylinder and shoved into its place after the cylinder is placed on the V's. The feed casing on the end of the bar contains gearing that admits of several changes to suit the work; this gearing is driven by a four-step cone. The

twisting hubs," the ends having a series of holes drilled in them, through which the wires are passed and twisted against the slats or pickets by giving the crank the number of turns desired. Any size, length or style of picket, slat or board can be used, also any size of wire down to No. 6, the machine, it is claimed, weaving all equally well. The apparatus is fitted with five twisting hubs, enabling the operator to make a fence consisting of one double strand of wire or up to five double strands, as may be preferred. When hilly or uneven ground is to be inclosed the machine can be readily adjusted to secure any desired plane. The ground frame which serves as



Henley's Monarch Fence Machine.

occupy a space 5½ feet long by 10 x 14 inches. The entire apparatus is constructed of few parts, and is strong and durable.

The Krudewig Furnace.

Messrs. Hynes, Bro. & Co., of 79 Walker street, New York, are introducing in this country a new smoke-preventing furnace, of which we show a longitudinal section in the annexed engraving. Its essential features are a coal-bin placed within the furnace, an inclined grate and a series of sliding blocks or plungers reciprocating under the fuel aperture on the upper end of the grate. These plungers are worked by a rock-shaft and lever outside of the furnace. A series

The cranks are so disposed on the shaft g that the plungers shall reciprocate alternately, so that as one advances that next to it will move back, and vice versa. The upper surface of this series of plungers e is made to constitute the bottom of the coal-bin D, formed in the upper front portion of the furnace. The coal thus drops from the bin over the front edge of the plungers upon the grate, its delivery from the bin being controlled by means of a vertical slide, J. This slide is moved up and down by means of a lever, K, pivoted to the side of the bin. The shorter arm of this lever is connected to the slide by a link, h; the longer arm projects out in front of the furnace, as shown. The height at which the slide J is set determines the depth of the fuel upon the grate. The coal is fed into the bin D through a chute or front hopper, I, closed by a door, d. To complete the combustion within the fire chamber of the furnace, an air-inlet passage, i, is formed over the top of the bin D, to extend down behind it and open into the fire-box immediately in front of the feed opening. This air passage is governed by a register, L, at the front of the furnace. Air passages k k are also formed in the side walls of the furnace, to lead from the front thereof to the rear, and thence back again, to communicate with the side of the cold-air passage t, so as to deliver a volume of heated air in front of the fuel entering the fire-box of the top of the grate. A circulation of air is also established, by means of suitable passages l, between the air-chamber E, over the furnace, and the air-inlet i, to heat the air supply furnished to the fire-box. The discharge opening or mouth F of the furnace is above the level of the upper end of the grate, and for use with a Corliss boiler the furnace is built in front of the boiler and its mouth is extended into the central flue. In this case the mouth E of the furnace is adapted to extend into the end of the flue, a non-conducting lining being interposed to protect the seam or joint of the flue and boiler, and supported by means of a metallic band m. The door J, it will be seen, is above the plungers e, that have been pushed inward; otherwise it would obstruct the action of the plungers.

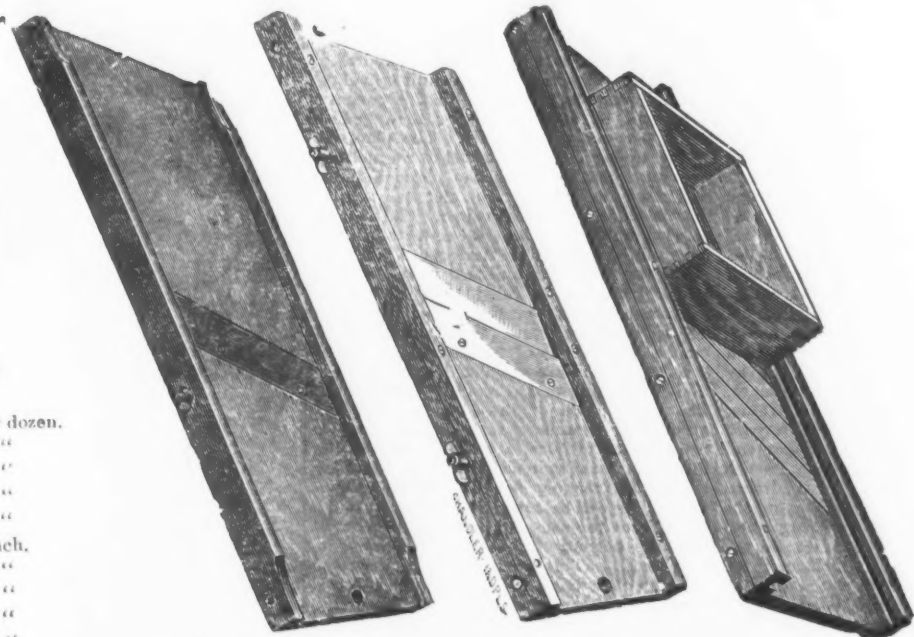
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" 6	" " " " " " " " " " " "
" 7	" " " " " " " " " " " "
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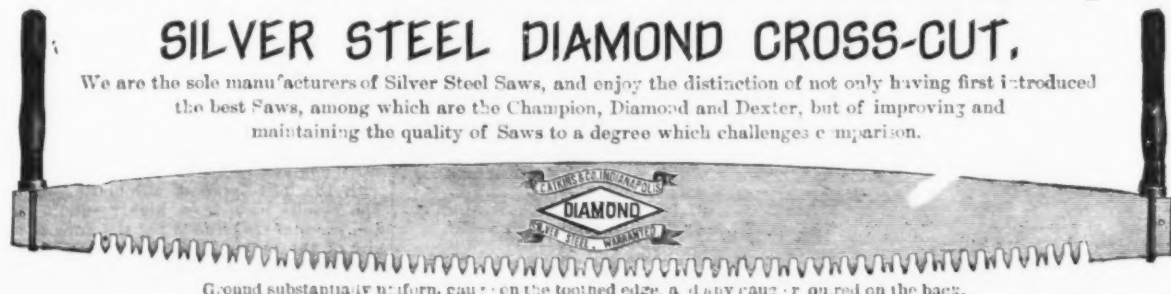
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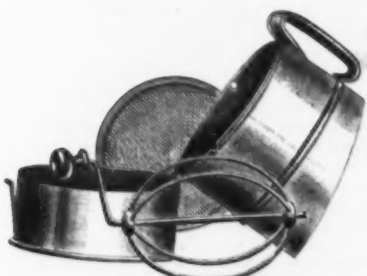
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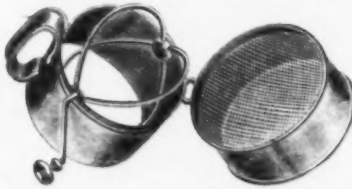
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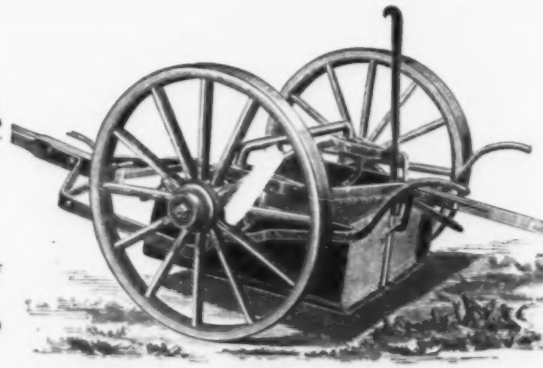
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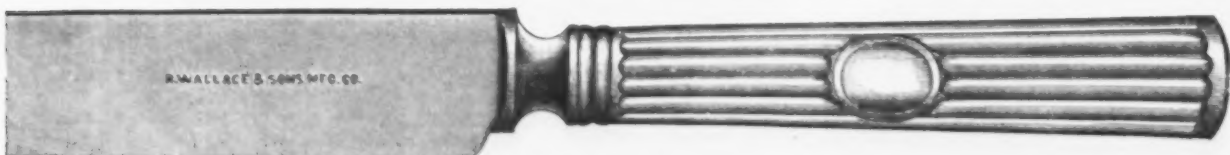
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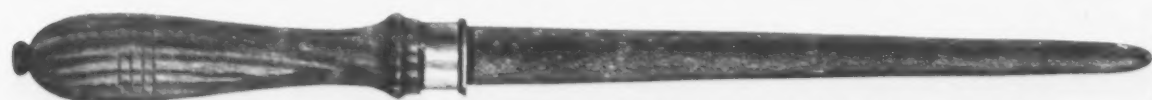
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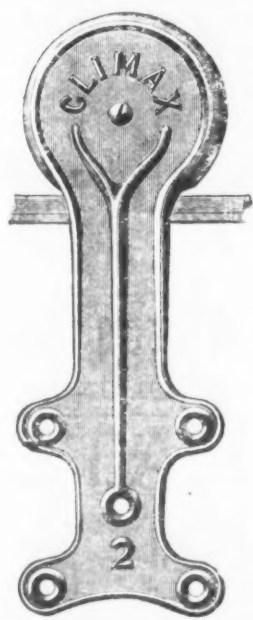
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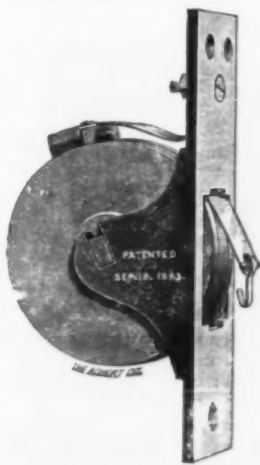
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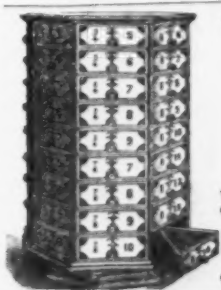
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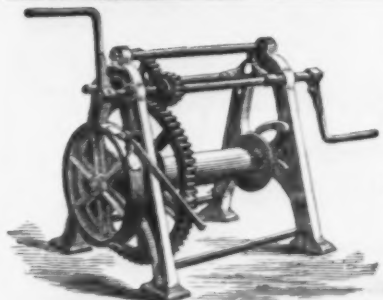
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head or bar support on the opposite end of the driving gear slides on the shears to accommodate different lengths of cylinders. The machine is strong, neat and powerful, and will be found a valuable one for railroad shops and steam-engine builders.

Dadoing Machine.

At the fair of the American Institute in this city, which closed early in December last year, J. K. Benway, of Albany, N. Y.,

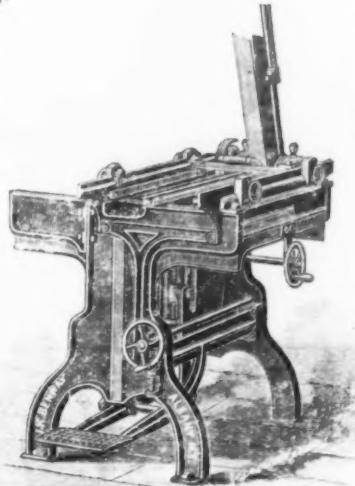
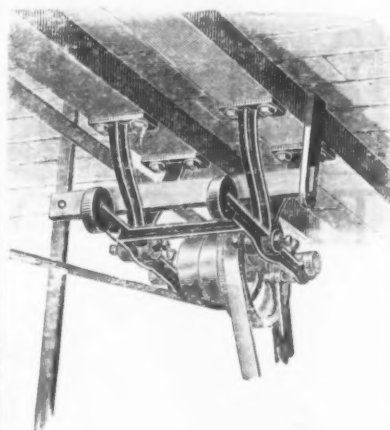


Fig. 1.—Benway's Dadoing Machine.

exhibited a dadoing machine which contains features of particular interest for workers in wood. A general view of the machine, with the peculiar construction of counter-shaft necessary to its operation, is shown in Fig. 1. The machine in its various parts is extremely simple, and in most respects would be understood by practical wood-workers by inspection of the engraving without a description. On the top of the machine is a traveling frame working in guides at right angles to the front. This frame carries the arbor and cutter-head, and has an adjustable rod connecting it with the counter-shaft above, which tilts as the yoke travels back and forth, thus keeping the belt to the proper tension. The cutting-head consists of two fine saws, some 5 inches in diameter, with all the teeth in each flaring outward except three on each side, which are filed straight across. The center one of each three is slightly set inward, thus cleaning the joint made by the cutter. Two studs are fastened into the stationary collar, passing freely through the saws and loose collar, and to these the blades are secured. There are four blades on each side. By alternately placing and removing these blades 16 cuts can be made varying from $\frac{1}{8}$ inch to $1\frac{1}{4}$ inches in width, or, if wider cuts are desired, they may be made by inserting another set of thicker plates. The blades are placed so that the joints do not range with those opposite. By this plan the bottom of the cut is made perfectly clean. The depth of the cut is regulated by raising or lowering the traveling yoke and frame already referred to. This is done by means of the crank-wheel shown at the front in the engraving. Thickness of material is accommodated by raising or lowering the bed, which has a movement of 5 inches. The bed is controlled by the crank-wheel shown at the right. The bed is set so as to allow the piece to be treated to pass through freely. When it has been put in proper position the foot is applied to the treadle shown at the front which causes the bed to rise still

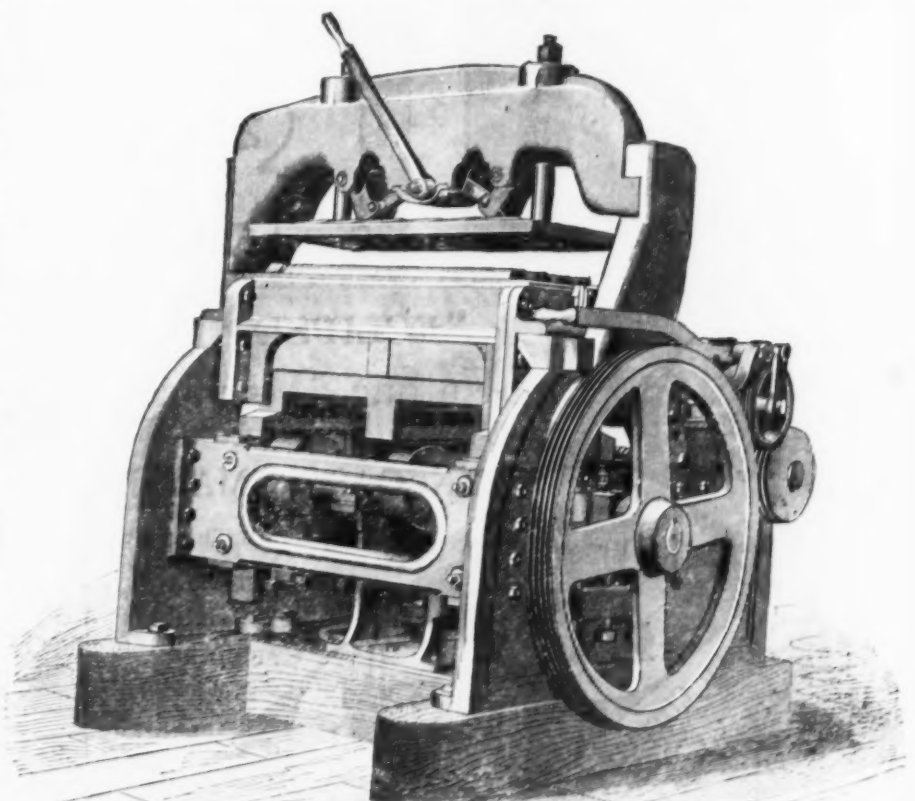
to regulate the length of the cut, so that it may be stopped before cutting clear through or otherwise, as may be desired. After the frame has been drawn forward in this manner the foot treadle is released, which causes the work to drop down, when the yoke is moved back to its original position. The top of the bed next to the front is furnished with a graduated spacer, which is set to the size of the pigeon-hole required—that is, supposing that work of this kind is being made. The work is then moved to the left until the stop on the spacer drops into the cut first made, when the operation is repeated. This is continued until all the required cuts have been made to complete the pattern. The operations above mentioned are more quickly performed than described. A special attachment is used on the machine for duplicating. This is shown in Fig. 2. The spacer already referred to is removed and a piece that has been dadoed is passed into the machine with the cut side down, and is moved until the first cut reaches the duplicator. The engraving of this attachment shows it adjusted between the two center beams of the bed. The right-hand stop is stationary and in line with the side collar connecting the head. The other stop is adjustable and moves from right to left by use of the hand-wheel until the full width of cut that is being made is reached. The pattern now being held by the duplicator, a tack or small spur is driven into it to prevent the next piece, which is placed upon it, from slipping, when the same operation as already described takes place. By this provision each cut is made to come directly opposite the one on the other side; hence all the pieces made are exact duplicates of the first. If variations in spaces have been made in the first, corresponding variations will by these means be secured in the duplicates. With reference to the rapidity with which work can be done with this machine, the maker asserts that by it from 1500 to 2000 pigeon-holes can be made in a day, the mere laying out of which by hand would be quite expensive. The method of duplicating above described applies to various other kind of work, such as gaining out stepladders, window-frames, door-jambes, stair-stringers, &c., and grooves at any angle can be made. By removing the dado-cutters and inserting a fine cut of saw, the machine can be used for mitering or cutting up material for drawers and similar work where extreme accuracy is desired. The collars used with the dado-head are provided with heads in which may be secured various cutters for molding panels and other similar work at any angle required. Molding around square posts, sometimes called "square turning," can be done by the same means.

Aiken's Improved Sand-Molding Machine.

Messrs. Aiken & Lighton, of Birmingham, Ala., are putting on the market a new sand-

saving obtained in repairs and renewals. Another feature of the machine is the simplicity of its construction, and the fact that any active boy can learn to operate it in a very few lessons. The machine sets the patterns, rams the sand and draws the patterns during one revolution, without any rapping or sponging of patterns, thus forming a perfect mold. All practical molders will agree with us that a perfect mold should be firm and compact around the patterns, and have a soft back to allow the free escape of the gases generated in pouring. Such a mold is not always made by hand, but with the machine which we illustrate highly satisfactory results are said to have been obtained in all cases.

The machine is made with a follower and plunger, the patterns being attached to an independent head which is fitted to rest on the plunger-head. The follower plate is fitted to surround the patterns, and is attached to the follower-head. The follower and pattern-head work independently of each other in a box, which serves as a guide and gauge for the proper amount of sand to supply the reduction in compression. On this box adjustable pins and sockets are placed to hold flasks. The sand hopper is furnished with a drawer having an independent bottom. When this drawer is pulled out it leaves the bottom at the edge of the flask, where it passes over and deposits the sand. It is then drawn back, striking off the surplus sand, and engaging the bottom at the proper place, carries all back into the hopper. A swinging binder plate is then brought over and holds the flask in place to resist the pressure, while the revolving of the shaft, on which a series of cams is placed, raises the pattern head and follower simultaneously, forcing the patterns and sand into the flask, and as the shaft continues its revolution the patterns are withdrawn, the follower-plate remaining up to support the sand until the patterns are drawn entirely out, thus leaving the mold complete and ready to be carried away. The machine here shown has no hopper or drawer, but is intended to have the sand supplied to it by a conveyor. Where several machines are used in a foundry a line of conveyors is located below the level of the foundry floor, which permits sand being supplied to it at different points along the entire length of the foundry, delivering the sand at the foot of the elevator. This delivers it to an upper line of conveyors, and supplies the machine with a sufficient amount of sand in each half flask. The arrangement of a conveyor furnishes an automatic feed for the machine requiring no attention. With inexperienced labor this machine will mold from 100 to 200 flasks per day of any of the following castings: Railroad castings, such as draw-bars, oil-boxes, brake shoes, brake heads, center-plates, stake-pockets, loops and bases for steam radiators; gas, steam and water pipe fittings, cocks, valves and other plumbers' goods, axle-boxes, pump chambers, sad-



Aiken's Sand-Molding Machine.

molding machine, of which we annex an engraving. The machine is constructed on entirely new principles, and represents radical changes as compared with the old style of construction. It is claimed to combine in a higher degree than any other the important elements of simplicity, durability and efficiency, and all the attendance required is simply some person to feed it with sand, put on flasks and carry away the molds. No skilled labor is required. The machine is driven by power, and will make molds as fast as flasks can be put on, filled with sand and carried away. One very important point is that, where the work to be

goods, axle-boxes, pump chambers, sad-irons, plow clevises, sash weights, &c. The machine weighs 7000 pounds; the flask used measures 16 by 37 inches; draws $4\frac{1}{2}$ inches.

Ex-President Gowen, of the Reading Railroad, is credited by a Philadelphia paper with saying that the manufacturer must be better taken care of by the anthracite producer, even if it is necessary to reduce the price of coal \$1 per ton. The spirit of all the anthracite companies is understood to be the same. If this is the policy of the anthracite companies in 1886 it is stated that the pig-iron manufacturers will be given an advantage of at least 50 or 75 cents per ton over the present cost of production. The inroads of coke upon anthracite coal in the manufacture of iron are becoming very serious, and this is a disturbing factor of no small importance that has yet to be met.

"The French fisheries," says London Truth, "do not seem to be in a very flourishing state, to judge from the official report of last year's trade. There were 27,000 men and 30,000 vessels engaged in it, and the value of the fish taken was £3,500,000, which was a falling off of £770,000 as compared with the previous year, although 1400 more men were employed."

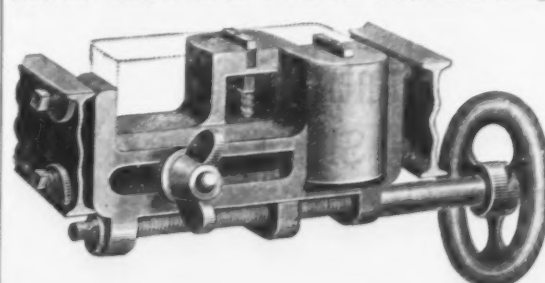
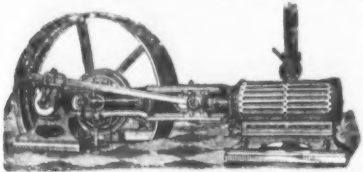


Fig. 2.—Duplicator Used on Benway's Dadoing Machine.

further, thus clamping the work tightly to the cross-rails. This method of treating the work has the good effect of straightening it out in case it should be warped before the cuts are made. When the work is in this position the traveling frame is quickly drawn forward by the hand of the operator until it rests against a clamp or stop that is fastened at the proper point. This stop serves

molded is the same in cope and drag, only one-half the number of patterns are required when using the machine that are required when molded by hand; in other words, six patterns will produce 12 castings to the flask, thus saving one-half the cost in making patterns. The latter being fastened to the machine, and no rapping being necessary in withdrawing them from the mold, a great

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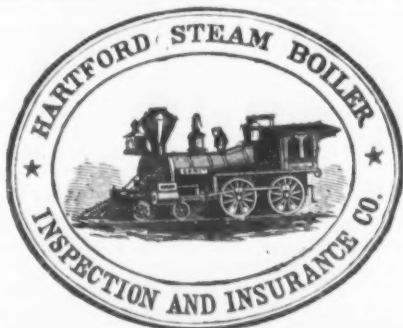


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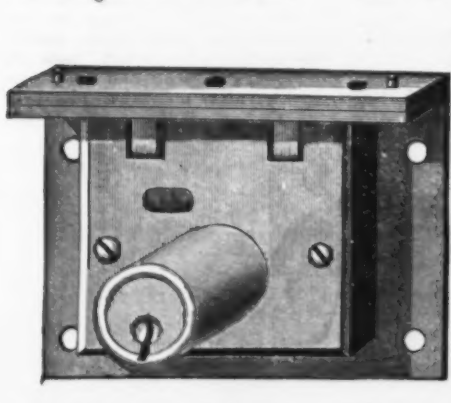
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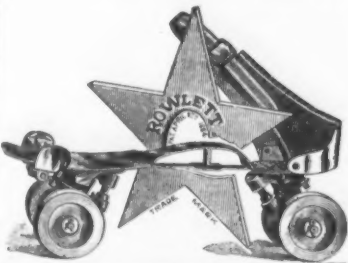
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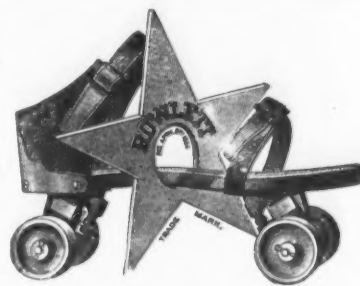
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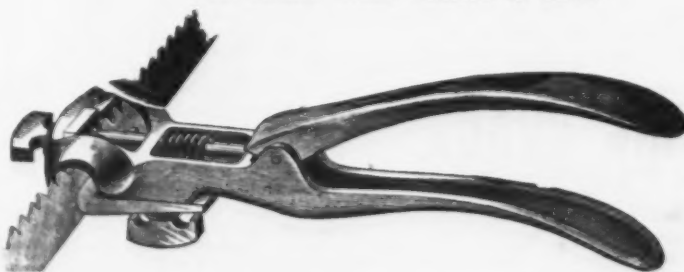
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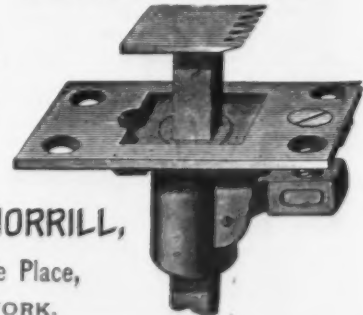
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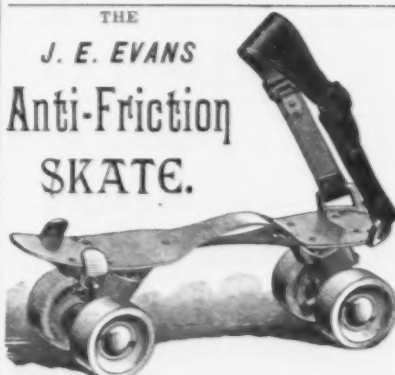
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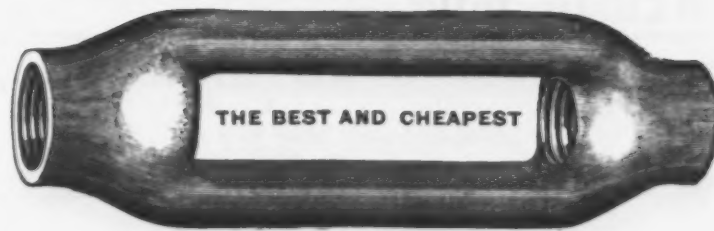
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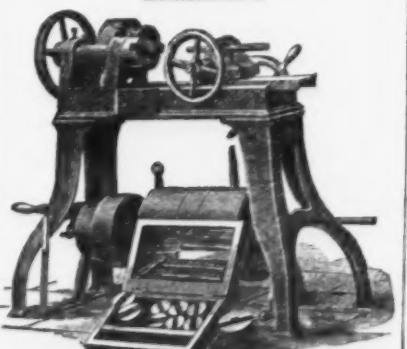
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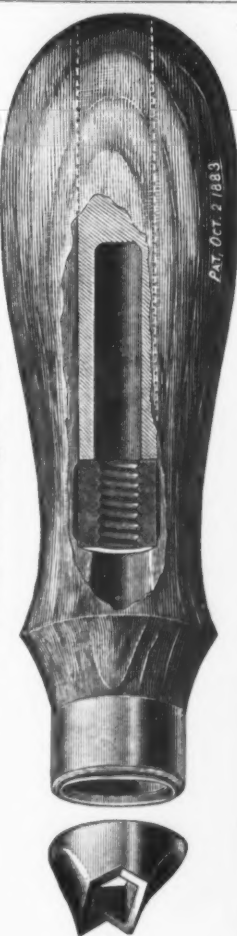
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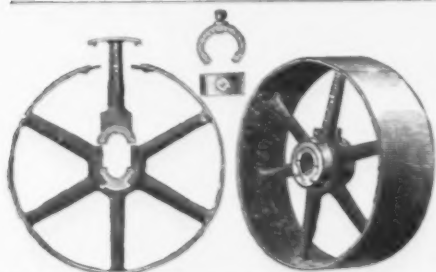
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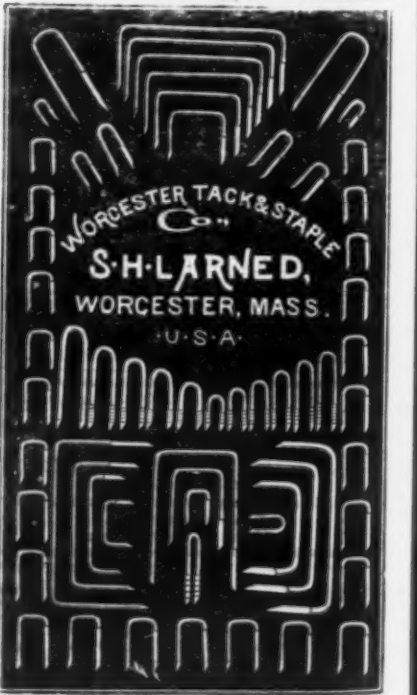
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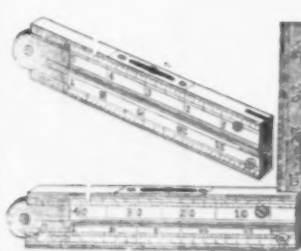
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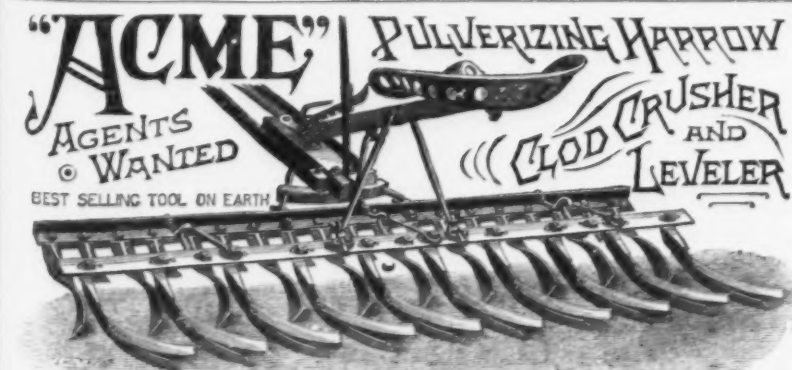
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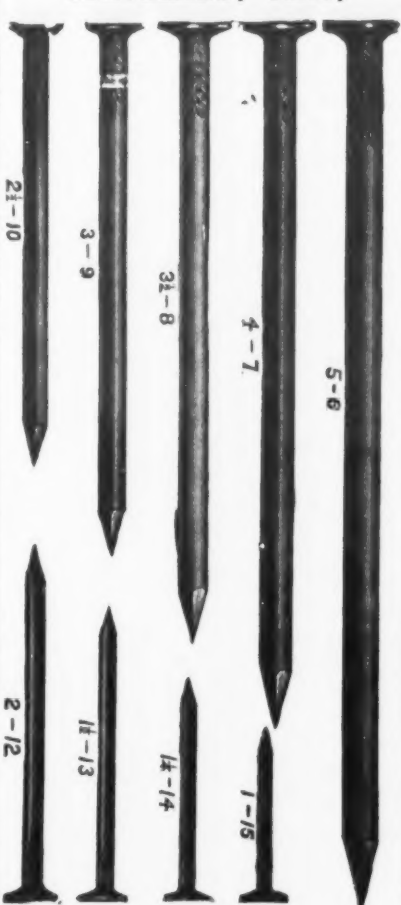


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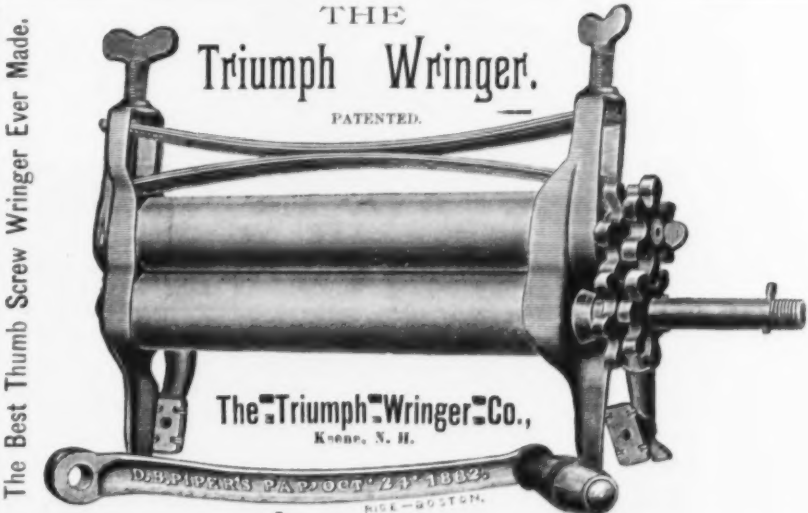
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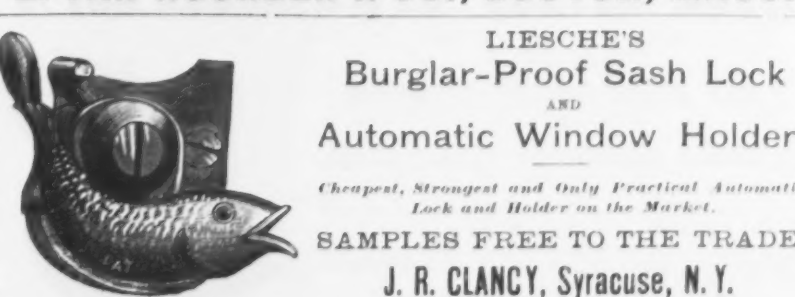
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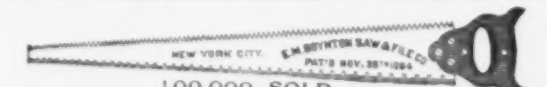
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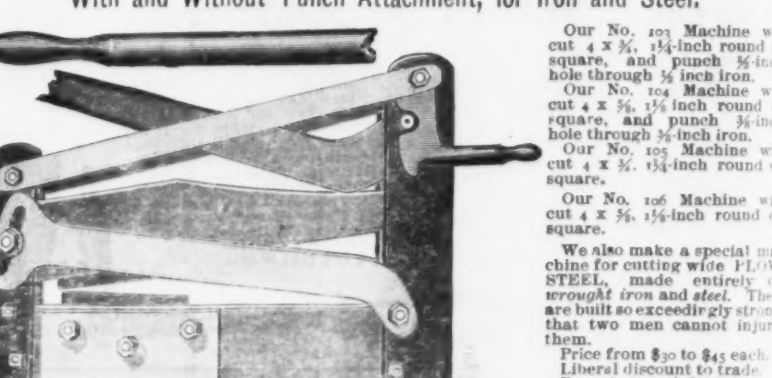
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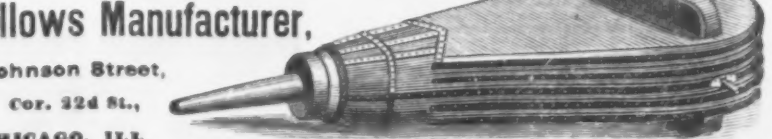
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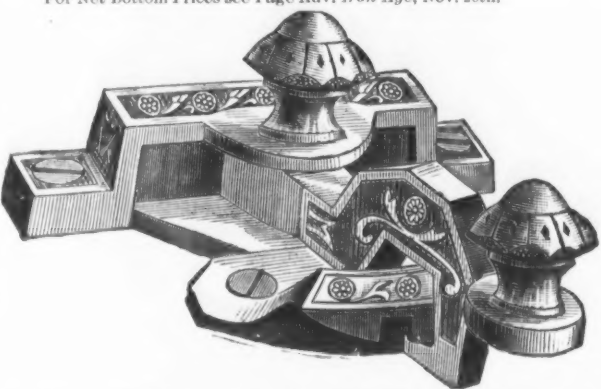
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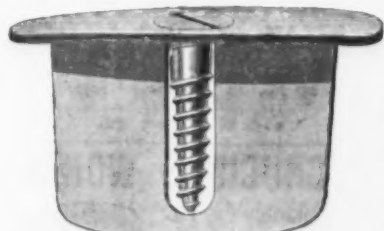
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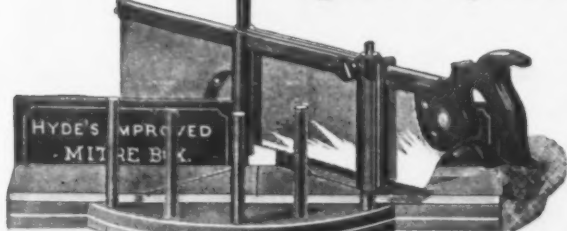
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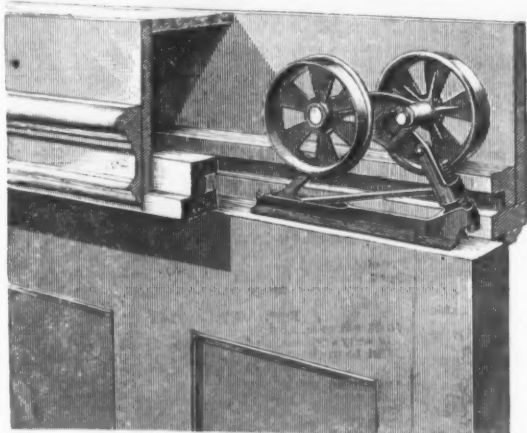
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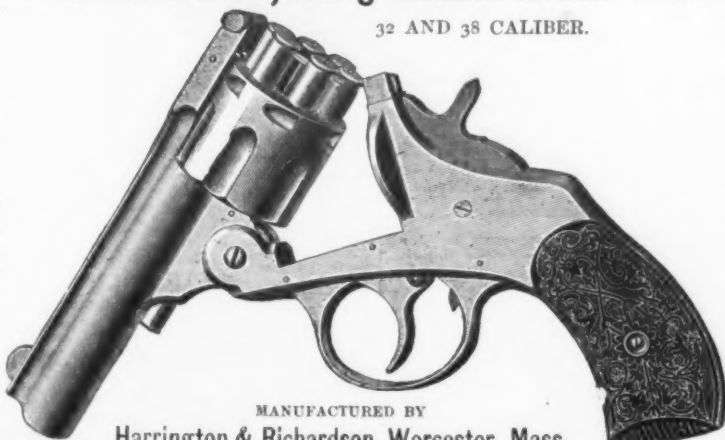
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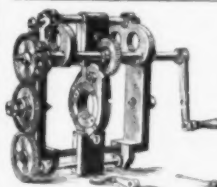
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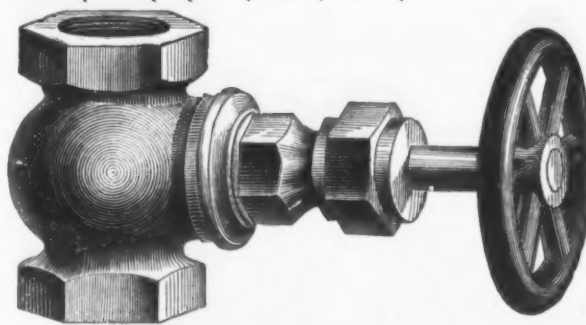
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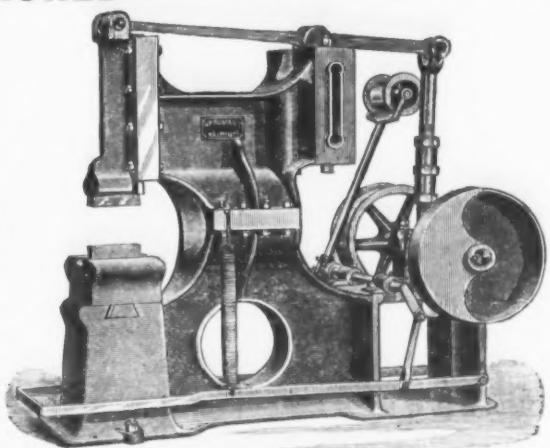
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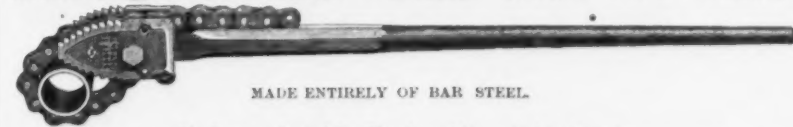
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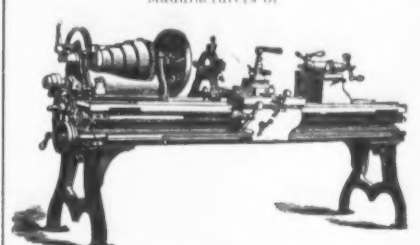
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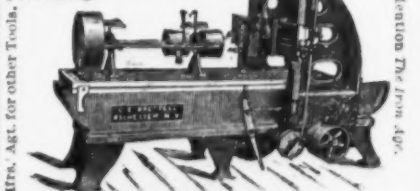
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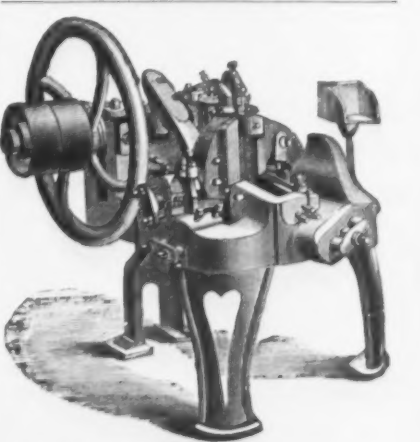
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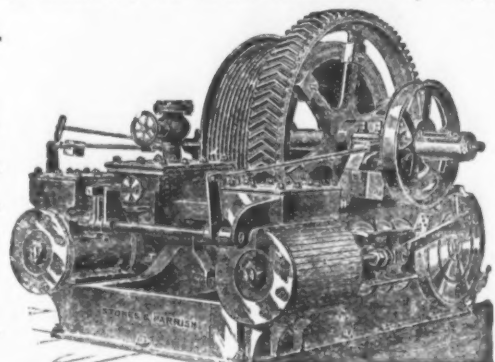


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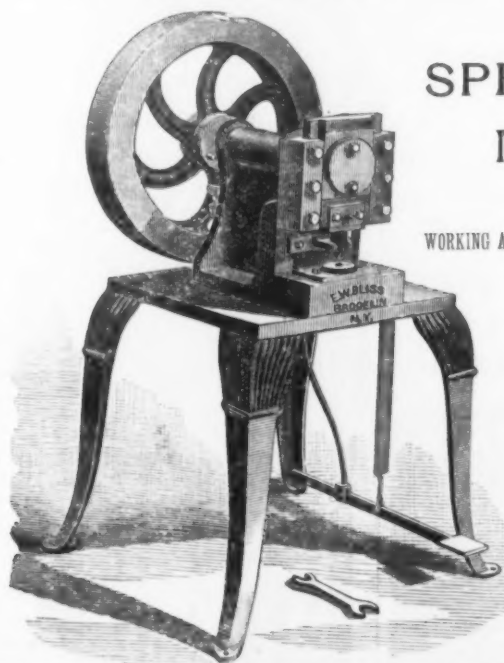
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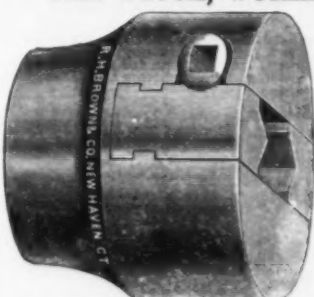
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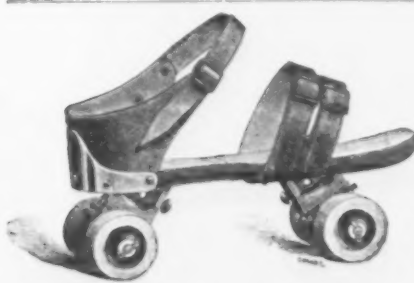
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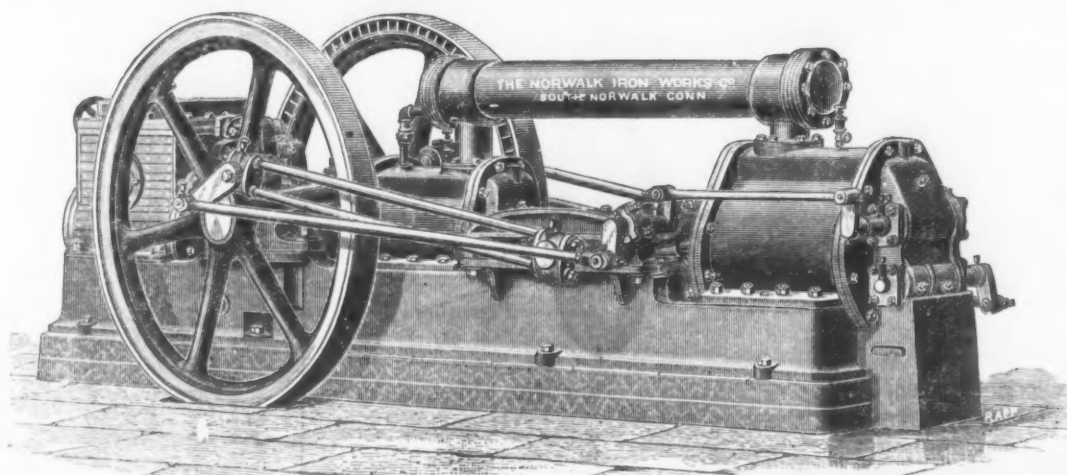
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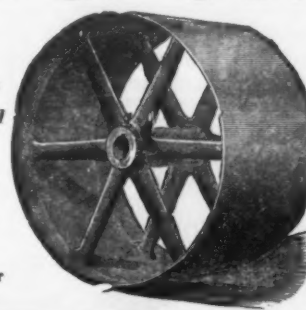
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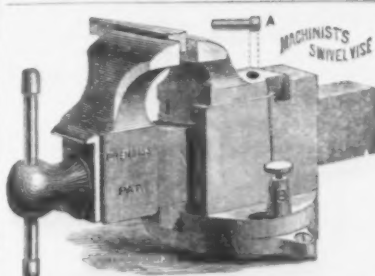
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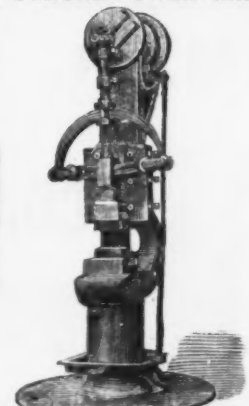
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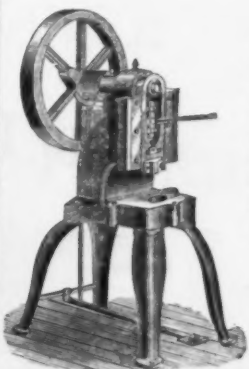
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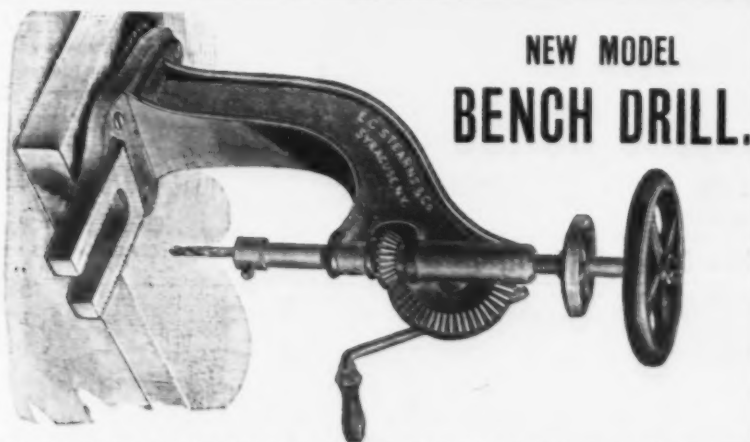
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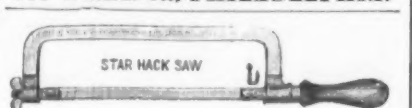
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